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SUMMARY OF RECENT ABSTRACTS*

VII. HELMINTHIASIS

General

Over half of 2,201 persons examined by BOVENTER (p. 251) in Sicily and Italy were found to harbour intestinal worms, of which the most common were *Ascaris* and *Trichuris*. The author used the method of direct smear. Of 1,000 children examined in Poland by KOZAR (p. 250), 411 were found to be infested by various worms. The author used a flotation method for the examination of faeces.

An account is given by POINDEXTER (p. 52) of the helminthic infections found in Liberia.

In Mexico 39·4 per cent. of 36,545 specimens of faeces were found positive for worm eggs at the Central Laboratory. MAZZOTTI (p. 252) gives details of the findings, and shows that the infestations were not as a rule heavy. Intestinal helminthic infections in part of Cuba are reported by ORTEGA CANET (p. 53). CARDOSO and DE CARVALHO (p. 53) report the common worm infections of São Paulo.

NÁJERA (p. 1004) has devised a technique for the concentration of helminth eggs in faeces, details of which are given in the abstract. Deep-freezing is not a satisfactory method for preserving faeces containing helminth eggs for direct or flotation methods of examination (GOLDMAN and JOHNSON, p. 552).

PAUTRIZEL *et al.* (p. 375) have determined the histamine content of some helminths, but they do not think that the amount of histamine is sufficient to cause the toxic manifestations seen in carriers of these parasites.

A general account of immunology in helminth infections has been written by VOGEL (p. 862).

In a Spanish publication GONZÁLEZ CASTRO (p. 1004) discusses the mutual relations between helminths and bacteria, and the possibility that helminths may act as transmitters of protozoa. This long article should be read in the original. GRAHAM and ORR (p. 763) report a case of abscess of the liver due to *Staphylococcus aureus*, which had probably been implanted in places where there were symptomless schistosomal lesions.

WIGAND (p. 759) has published a summary of the action of many of the anthelmintic drugs.

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1950, v. 47. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

Trematodes

Schistosomiasis, General

Alves (p. 375) has made careful measurements of the eggs of *S. bovis*, *S. mattheei* and *S. haematobium*.

Living schistosome cercariae, when placed in serum from men or animals who have recently suffered from schistosomiasis, develop a close-fitting transparent membrane which is different from the loose precipitate which occurs round similar cercariae placed in human and animal sera not related to infection. Vogel and Minning (p. 635) have investigated this phenomenon as a test for infection. Serum appears to lose the power to form the membrane some months after cure of the infection, but it shows it fairly early, and the test may therefore be useful in diagnosis of present or recent infections. Living cercariae of *S. mansoni* can be agglutinated by immune sera, even if inactivated by heat, and also by sera from monkeys recently infected with *Trichinella* (Liu and Bang, p. 1105).

Gelfand (p. 376) has given a comprehensive account of the diagnosis and prognosis of schistosomiasis. The radiological features of chronic pulmonary schistosomiasis are discussed by Erfan and Deeb (p. 253) ; they comprise focal arterial changes with or without heart changes. A radiological study of cor pulmonale due to schistosomiasis is reported by Sirry (p. 477).

In a long contribution Halawani and Dawood (p. 1204) sum up their experience with short courses of treatment for schistosomiasis in Egypt. On the whole the defects of intensive courses are held to outweigh the advantages, probably because so many of the patients have intense infections and are poorly nourished. Those who are physically fit and whose pulse rate returns to normal within 2 minutes of an exercise test may be given a 4-day Fouadin course, or a 5- or 10-day tartar emetic course, but others require more protracted courses. Various schedules of Miracil D were tried, and the best results were obtained with a single daily dose of 22 mgm. per kgm. for 12 days. The authors make the point that the higher the incidence of schistosomiasis the heavier the individual infections.

Kikuth and Gönnert (p. 54) give an account of their discovery of Miracil, and describe their technique for testing new compounds on mice and monkeys.

Decourt *et al.* (p. 140) outline the various factors and circumstances which should be taken into account in assessing the toxicity to man and animals of parasiticidal and molluscicidal substances. A " unit of toxicity " is defined.

Wolfs and Devignat (p. 637) have found that in Lake Kivu (Belgian Congo) copper sulphate is transformed into basic salts, and in the doses used is ineffective against snails. In two field experiments copper oxide was effective in eliminating snails. Details of dosage should be sought in the original. Pinto and Penido (p. 765) advocate the use of sodium tartrate or tartaric acid with copper sulphate for the control of snails ; this prevents precipitation of the copper salt by the bicarbonate usually present in surface waters. A strength of 2 p.p.m. is recommended.

von Brand *et al.* (p. 56) have examined the effect of a group of potential molluscicides on the oxygen consumption of *Australorbis glabratus*.

In a test of 10 organic compounds for their capacity to kill snails, Nolan and Berry (p. 143) found only two, pentabromophenol and pentachlorophenol, which gave promise. Both are caustic and irritating to the mucous membrane of the respiratory tract of man.

Omer-Cooper (p. 476) noticed that in pools in South Africa which had been sprayed with DDT from the air in the course of the anti-tsetse campaign, there was a lack of insect life but an excess of snails, and *vice versa*. It seems possible, therefore, that this use of DDT may increase the chance of infection with trematodes.

Schistosoma haematobium infections

PANI (p. 862) reports 114 cases of *S. haematobium* infection from Libya.

PINTO (p. 1004) has made a survey of a number of villages in Portuguese Guinea, in which he examined several hundreds of specimens of urine for eggs of *S. haematobium*, finding more than half of them positive.

WALLERSTEIN (p. 253) notes that *S. haematobium* may persist in man for 30 years and *S. japonicum* for 20–25 years, and he quotes a case of *S. mansoni* infection in which there were living flukes 26 years after the last possible date of infection.

GILLET (p. 632) has demonstrated the complete life cycle of *S. haematobium* in *Physopsis africana* in an area of the Belgian Congo, but two other snails, *Pyrgophysa* [*Bulinus*] *forskali* and *Lymnaea natalensis undussumae* were refractory. He was able to infect mice, but not guineapigs. SIVALINGAM (p. 632) failed to infect some of the common fresh-water snails of Ceylon with *S. haematobium* and *S. mansoni*.

NEWSOME (p. 378) describes a simple apparatus by means of which miracidia present in the washed sediment from urine may be detected. This provides a simple test of cure of *S. haematobium* infections.

Pulmonary complications are common in *S. mansoni* infections, but WATSON *et al.* (p. 1203) in Iraq have found several cases in which *S. haematobium* was involved, and in which the worms or eggs were found at autopsy in the chronic lesions. ERFAN (p. 633) has found ova of *S. haematobium* several times in the sputum of one patient ; no ova were found in urine or faeces, though there was sigmoidoscope evidence of bowel infection. The patient complained of cough and dyspnoea. The author suggests that this condition may not be as rare as it is supposed to be, and that cases may be missed if sputum is not examined.

BLANC and TOUZIN (p. 1104) report a case of Egyptian splenomegaly due, not to *S. mansoni* as is usual, but to *S. haematobium*. The spleen was removed and was found to contain very large numbers of eggs of *S. haematobium*.

CHARLEWOOD *et al.* (p. 54) report on the frequency and distribution of lesions due to *S. haematobium* in the pelvic organs of women in South Africa. It appears that even if symptoms indicate that only one organ is involved, the eggs are usually present in many organs. Details are given of the pathology of this infection, and it is noted that bilharzial appendicitis is even more common than involvement of the reproductive organs.

MARILL and FRIESS (p. 253) used Miracil (Nilodin) in a few cases of *S. haematobium* infection, but found eggs in the urine up to 16 days after the last dose. In comment, HAWKING states that no distinction is made between living and dead eggs, that the eggs may have been deposited before treatment began, and that other workers have obtained good results with similar doses. ALVES (p. 1006) conducted an investigation of Miracil D and Nilodin (the same chemical compound but made by another firm) in the treatment of *S. haematobium* infections. When Nilodin was given in coated capsules in total doses up to 100 mgm. per kgm. divided over a period of 3 days, the results were disappointing. Although these coated tablets are well absorbed by healthy Europeans, it is possible that Africans may not be able to assimilate them so well because their intestines are not healthy. In a later paper the same author (p. 1007) shows that uncoated tablets of Nilodin and Miracil D are as effective as any known drug for this infection. In Southern Portugal the results obtained by COLAÇO (p. 1005), in the treatment with Miracil D of a few patients with *S. haematobium* infection, have not been so good as other workers have reported elsewhere. He thinks that the strain of *S. haematobium* may differ from other strains.

AZAR *et al.* (p. 141) have given Repodral (Fouadin) in total doses of 34 ml. of a 6·3 per cent. solution, over a period of 3 days, in patients with *S. haematobium* infection. Re-examination 16 days later showed that 60–70 per cent. had ceased to pass viable eggs. This intensive course seemed to be useful, and the side effects were not serious.

S. mansoni infection

PONS and REYES (p. 759) found post mortem evidence of *S. mansoni* infection in 14 of 34 soldiers from Porto Rico who died from other diseases ; this is a higher rate than had been suspected. The authors describe the pathological appearances.

ROSS and BUEDING (p. 633) kept *S. mansoni* alive in various media *in vitro*, to a maximum of 18 days in serum. It seems that eggs of *S. mansoni* are rather short-lived ; the maximum span of life in undiluted faeces in tropical temperatures rarely exceeds 8 days. MALDONADO *et al.* (p. 553) show that exposure to direct sunlight is deleterious to the eggs, and that defaecation in the shade leads to longer survival of eggs, and is therefore particularly dangerous.

BUEDING and KOLETSKY (p. 863) record the content and distribution of glycogen in *S. mansoni*.

STANDEN (p. 552) describes the establishment of *S. mansoni* infection in mice, through *Australorbis glabratus*. Attempts to establish *S. haematobium* failed. He gives information on certain points observed in the course of this study.

YOLLES *et al.* (p. 142) show that when rabbits are infected intraperitoneally with cercariae of *S. mansoni* fewer worms reach the lungs and portal circulation than when infection is induced through the skin. It seems that there is a high mortality of cercariae in the peritoneal cavity or adjacent tissues. The hamster is a better host than the rabbit for *S. mansoni*. POTENZA (p. 765) describes peritoneal nodules in guineapigs infected with *S. mansoni*, but LAGRANGE and SCHEECQMANS (p. 1105) show that the guineapig is an unfavourable host.

In experiments in which *Planorbis boissyi*, *P. pfeifferi* and *Australorbis glabratus* from various areas were exposed to infection with *S. mansoni* also from various places, FILES and CRAM (p. 376) found striking differences in the susceptibility of the snails to the various strains. For instance *A. glabratus* from Porto Rico was easily infected with most strains, and *A. glabratus* from Venezuela was easily infected with the same strains, but *A. glabratus* from Brazil could not be infected with any but the strain from Porto Rico (slightly) and the cross Brazil-Porto-Rico strain (easily). *P. pfeifferi* from Liberia was easily infected with New World strains and with an Egyptian strain, but *P. boissyi* from Egypt would not take the New World strains. Observations made by LAGRANGE *et al.* (p. 633) also indicate that there are biological strains of both *S. mansoni* and *A. glabratus*, which are characterized by different degrees of susceptibility to infection or of ability to infect.

SCHWETZ (p. 634) and also COURTOIS and WANSON (p. 634) have shown that *Planorbis choanomphalus* from Lake Albert can act as intermediate host of *S. mansoni*.

MALDONADO and VÉLEZ HERRERA (p. 553) have shown that a single naturally infected *A. glabratus* may harbour cercariae of *S. mansoni* of both sexes, and that bisexual infection may predominate in highly endemic foci. The theory that single naturally infected snails give rise to cercariae of one sex only, therefore, is not confirmed.

SCHREIBER and SCHUBERT (p. 375) have exposed *Australorbis glabratus* to varying numbers of miracidia of *S. mansoni*, and give an account of the proportions infected. A detailed study of the development of the sporocysts of *S. mansoni* in the snail *Australorbis glabratus* is recorded by OLIVIER and MAO (p. 141). The details should be sought in the original.

MARTINS (p. 760) has written, in Portuguese, a monograph on the laboratory diagnosis of *S. mansoni* infection, in which he discusses methods of examination of faeces, skin tests and other tests. This is a lengthy volume which cannot adequately be summarized.

Intestinal schistosomiasis is increasing in the Belgian Congo, both in incidence and distribution. COURTOIS (p. 636) discusses diagnosis, and has found that by filtration of a formolized suspension of faeces through silk (32 threads to the centimetre) he obtains as good results as with rectal biopsy and other methods. He has confirmed the opinion that intravenous injection of Bayer 205 is useful in revealing concealed infections with *S. haematobium* and *S. mansoni*, by causing ova to appear in the faeces. He notes that there is a high incidence of *S. mansoni* infections round Lake Albert, but that clinical symptoms are not common there. Various drugs were tried, of which tartar emetic and glucantime were found to be the most useful. In one investigation, RODRIGUEZ-MOLINA *et al.* (p. 1206) found that examination of faeces for eggs of *S. mansoni* was a more reliable test than rectal biopsy for detecting the presence of infection after treatment.

As a result of a series of comparative tests, HERNÁNDEZ MORALES *et al.* (p. 761) conclude that skin tests with a cercarial antigen, and rectal biopsy, are much better than examination of faeces for the diagnosis of *S. mansoni* infection. But all three methods should be used.

In experiments on mice, WATTS (p. 55) has found that injections of an antigen made from pulverized *S. mansoni* afforded some slight protection against subsequent infection with the same worm, in that the number of worms recovered from the treated animals was only one half of the number recovered from controls.

MAYER and PIFANO (p. 762) write favourably of an antigen "bilharzin" prepared from pulverized *S. mansoni* extracted in Coca's solution at 56°C., for the diagnosis of schistosomiasis ; they find it as useful as their previous antigen which was extracted, much more slowly, in the ice chest. MAYER *et al.* (p. 634) consider that this antigen "bilharzin" has a very high degree of specificity. DA SILVA and DA COSTA (p. 376) have used an antigen from the hepato-pancreas of *Australorbis glabratus* infected with *S. mansoni*, and another from cercariae, in diagnosis. Most patients with proved disease reacted, but the cercarial antigen seemed the more specific. STANDEN (p. 634) describes a method for concentrating cercariae of *S. mansoni*, for the preparation of an antigen.

A long and comprehensive monograph on the clinical aspects of *S. mansoni* infection has been written by DA SILVA (p. 377), who has added sections on distribution, pathology, and control to those on the strictly clinical material as indicated in the title.

PIFANO (p. 762) describes and discusses the Banti syndrome in *S. mansoni* infection, basing his observations on 182 cases. There are 3 clinical stages of enlargement of spleen and liver, with anaemia and other blood changes. The liver becomes cirrhotic in the third stage, and there may be severe haemorrhages and ascites. Eggs were present in the faeces of most of the patients studied, and the author made use of complement-fixation tests, and of skin tests, in diagnosis. ARMBRUST (p. 378) describes a case of myocarditis in which many schistosome eggs [*S. mansoni*], with surrounding tubercles, were found in the heart muscle. From Eritrea, SOFIA (p. 636) reports a case of *S. mansoni* infection associated with cerebral symptoms, which cleared up under treatment with antimony.

A long thesis on the treatment of *S. mansoni* infections with antimony has been published by DIAS (p. 177). In addition to an account of the worm and

of the pathology of the disease, the author discusses the treatment of 367 patients under his own care, and gives much information on clinical findings.

A comparison by HERNÁNDEZ MORALES *et al.* (p. 477) of the effects of Fouadin and anthiomaline in the treatment of young men with rectal schistosomiasis showed that both were valuable in the doses used, but that the results with Fouadin (78 per cent. cures) were rather better than with anthiomaline (72 per cent.). In a comparative test of anthiomaline, urea stibamine, neostibosan and stibanose in the treatment of *S. mansoni* infection, HERNÁNDEZ MORALES *et al.* (p. 764) found that the last three were disappointing, but that the immediate effect of anthiomaline was very favourable. The drugs were pushed as far as they could be tolerated, for courses lasting about 14 days.

CAMERON and VAN SOMEREN (p. 764) report apparent cure in two cases of *S. mansoni* infection treated with Miracil D.

S. japonicum infection

WRIGHT (p. 1207) sums up information on the extent and intensity of *S. japonicum* infection in the Far East, where enormous numbers of people are affected. He also discusses the nomenclature of the snail hosts ; most of the recorded hosts are synonymous with *Oncomelania hupensis* or *O. nosophora.* Measures of control are stated under 6 headings. This is a useful general paper.

HUNTER *et al.* (p. 1007) report a survey of *S. japonicum* infection on Mindoro, Philippine Islands ; in one area 40 per cent. of the people examined were found to be infected, and eggs were found in the faeces of pigs, dogs and a buffalo. The intermediate host is *Oncomelania quadrasi.*

LIU and BANG (p. 1106) describe the course of slight experimental infection of monkeys with *S. japonicum.*

VOGEL (p. 554) quotes experiments on dogs and monkeys which show that immunity to reinfection with *S. japonicum* can be built up by repeated exposure to small infections, or by a few less frequent infections with large numbers of cercariae.

MAO *et al.* (p. 478) have studied the effects of light, temperature, *p*H, and other factors on the emergence of cercariae of *S. japonicum* from *Oncomelania hupensis.* In a study of potential snail hosts of *S. japonicum,* ABBOTT and HUNTER (p. 379) have published notes on certain snails from Japan. The same authors (p. 379) tested some of these and found them incapable of serving as intermediate hosts of *S. japonicum.* As a result of a study of *Oncomelania hupensis* and *O. nosophora* in Lower Central China, HSÜ (p. 1008) concludes that the most important habitats of these snails are the irrigation ditches, from which water is led to the rice fields. The snails are also found in canals, but not to the same extent. Farmers probably acquire infection chiefly in the rice fields.

LING *et al.* (p. 380) have given a comprehensive account of the clinical and diagnostic features of schistosomiasis due to *S. japonicum,* based on an analysis of 200 cases. For diagnosis a technique for finding miracidia hatched from specimens of faeces proved useful. In treatment, the authors obtained the best results with tartar emetic ; Fouadin was disappointing.

In a long and detailed paper on *S. japonicum* infection in American troops who served in the Philippines during the war, MOST and his colleagues (p. 1009) describe the clinical features of the disease, and the methods of diagnosis used, which included X-ray examination of the lungs and intestine. Intradermal tests with an antigen prepared from *S. mansoni* proved highly specific. In treatment Fouadin and antimony potassium tartrate were used, in different schedules of dosage, and the results are set out. Emetine failed in each of 4 cases, but anthiomaline was effective in every one of the 5 in which it was

tried. It is not possible to summarize satisfactorily the account already published of this excellent paper.

KANE and MOST (p. 1013) summarize the literature on schistosomiasis of the central nervous system, pointing out that whereas *S. haematobium* and *S. mansoni* tend to affect the spinal cord, *S. japonicum* tends to affect the brain. Published records of cases are few, but during the war a number occurred in American troops in the Philippine Islands. An account is given of the pathology and symptomatology of the condition, and on the observations on which diagnosis was based, namely a history of exposure to potentially infested water, symptoms of general infection with the worm, and signs of involvement of the nervous system. The lesions are almost entirely due to eggs in the nervous system. Under treatment with antimony, further localization of eggs in the nervous system may be prevented, but operation may be needed for focal epileptic seizures. This is a most informative paper.

Tests have been made by HUNTER *et al.* (p. 380) to determine the extent to which the various cloth materials used in the U.S. Army would afford protection against cercariae of *S. japonicum*. Twill materials give rather more protection than woollen materials, but all would protect the legs to a considerable extent if tucked into the top of combat boots and if enough slack was present to form a cuff over the boot top.

Schistosome dermatitis

Noting that the adult form of "*Cercaria ocellata*" is unknown, EMMEL (p. 254) expresses the view that several species of cercariae found in Germany are referred to under that name. He has made observations on cercariae issuing from snails of various species, which were allowed to attack fowls, ducks, mice and human volunteers. MACFARLANE (pp. 765, 766) describes a new cercaria (*Cercaria longicauda*) found in snails in New Zealand, and shows that it is capable of causing swimmers' itch.

AUGUSTINE and WELLER (p. 143) tried skin tests with various cercarial antigens in rabbits infected with cercariae which cause swimmers' itch, but the results of the test were equivocal.

Fasciola, Clonorchis and Other Trematodes

MURPHY and PASCALL in England (p. 555) report three cases of *Fasciola hepatica* infection of the common bile duct. These were diagnosed over a period of 10 years, at operation for chronic cholecystitis. A case of infection with *F. hepatica*, studied after death, is reported from Germany by MOORMANN (p. 478). EHLERS and KNÜTTGEN (p. 638) report a case of *F. hepatica* infection in a child in Germany, and give details of the treatment administered, which was apparently useful. MINNING and VOGEL (p. 863) report three cases of infection with *F. hepatica*, seen in Germany ; two were probably due to eating sorrel and one to eating apples fallen into a water ditch. The authors describe the results of various serological and skin tests in these patients.

KENDALL (p. 381) has studied the development of *F. hepatica* in *Limnaea truncatula*. Temperature affects development, but the trematode develops best in hosts which have access to plenty of food.

In an account of parasitic diseases in Hong Kong, CHEN (p. 1103) notes that *Clonorchis sinensis* is relatively common in the Chinese, but that the patients seem to have been infected by eating imported fish, since the snail hosts could not be found there, and no local fish could be incriminated. In Nanking, which is outside the endemic area of clonorchiasis, HSU (p. 255) found that many of the fish *Ctenopharyngodon idellus* sold in the market were infected with cysts of *C. sinensis*. In this way the disease may be spread outside the endemic area if such fish are eaten raw, as is the case in some restaurants. EDELMAN

and SPINGARN (p. 56) in the United States found *C. sinensis* in 4 people who had previously lived in Shanghai. Treatment with methylrosaniline produced clinical improvement, but not cure, and chloroquine had no effect.

LING and TAUR (p. 381) give an account of the autopsy findings in a patient in whom over 900 *C. sinensis* were recovered. Tortuous cords of greatly dilated bile ducts gave rise to a roughened surface of the liver. RISSEL and HARTMANN (p. 863) describe a case of infection with *C. sinensis* in which the worms were found in the hepatic ducts at autopsy. Carcinoma of the bile ducts was also present, but it was not possible to decide whether the flukes had any part in causing the malignant condition.

Some evidence of success in the treatment of clonorchiasis with chloroquine has been obtained by BASNUEVO (p. 381) in 2 of 5 cases.

GOLYANITSKAYA (p. 382) found a single *Opisthorchis felineus* in a pulmonary blood vessel in a patient in Russia, in whose liver many worms and eggs were found. This is apparently the first report of *Opisthorchis* in the lung. The patient also had caseous tuberculosis of the lungs, with miliary spread.

KOO and WOO (p. 144) report a case of empyema associated with *Paragonimus* infection of the lung and pleura.

LIE KIAN JOE and BRAS (p. 861) report infection with *Plagiorchis javensis* in two patients in a lunatic asylum in Indonesia.

A case of human infection with *Dicrocoelium dendriticum* in a child in Munich is described by SCHEID *et al.* (p. 1208). Treatment with Fouadin appeared to be successful.

CESTODES

MARKOWSKI (p. 382) has studied species of *Diphyllobothrium* in birds ; one of them, *D. dendriticum*, is capable of being a natural parasite of man.

STUNKARD (p. 382) reviews the taxonomic history of *Diphyllobothrium latum*. HARLAND *et al.* (p. 1015) discuss infestation with *Diphyllobothrium latum*, and give an account of a case in a Finnish girl living in England. She had some megaloblastic anaemia. A second case is also mentioned. HITCHCOCK (p. 862) notes that infestation with *Diphyllobothrium* sp. is common in a group of Eskimos in Alaska.

Although there has been an increase in the incidence of cysticercosis in cattle in Scotland in recent years, SEILER and NORVAL (p. 1107) have been unable to find evidence of an increase in the incidence of human infestation by *Taenia saginata* in Edinburgh. HERNÁNDEZ MORALES (p. 255) has used atebrin, 6 to 8 tablets taken within 15 minutes together with sodium bicarbonate, for the treatment of infestation with *Taenia saginata*. Half of the patients vomited, and one patient became stuporous but soon recovered. The results on the worm were satisfactory. HERNÁNDEZ MORALES and STEVENSON (p. 256), however, used hexyl resorcinol as an emulsion, given by duodenal tube, in the treatment of *T. saginata* infestation, and consider it to be the drug of choice.

FENG *et al.* (p. 144) have tested the action of an extract of Areca nut on various tapeworms, and conclude that it affects primarily the nervous system of the worms, causing paralysis. *Filix mas*, on the other hand, affects primarily the muscles. Areca nut was effective in a cat infested with two kinds of tapeworm.

A study of *Cysticercus racemosus* removed from the brain of a patient is reported by TALICE and GURRI (p. 479) and by ARANA IÑIGUEZ *et al.* (p. 555).

NOR ELDIN and BAZ (p. 383) show that in Egypt *Hymenolepis nana* is more common than *Taenia saginata*, and that *H. diminuta* and *T. solium* are rare in man. They think that *Hymenolepis* infection, which is particularly common in children, is contracted as a result of hand contamination. Rats are probably not important in this connexion.

HARANT and FABREGAT (p. 864) report a case of infestation with *Dipylidium* [presumably *caninum*] in France.

LÓPEZ-NEYRA (p. 1017) discusses the nomenclature of the 15 species of *Raillietina* which have been described, and concludes that they can be reduced to 4, which include *Inermicapsifer*. JOYEUX and BAER (p. 555) discuss the species of *Inermicapsifer* found in East Africa and Cuba, and give a key to 14 recognized species of this genus. An account of *Inermicapsifer cubensis* is given by SOTOLONGO (p. 257).

For the first time a case of cerebral coenurosis has been reported from the Western Hemisphere, by JOHNSTONE and JONES (p. 1107).

Charles Wilcocks

(*To be continued*)

MALARIA

WORLD HEALTH ORGANIZATION. TECHNICAL REPORT SER. No. 38. **Report on the Malaria Conference in Equatorial Africa. Held under the Joint Auspices of the World Health Organization and of the Commission for Technical Co-operation in Africa South of the Sahara. Kampala, Uganda, 27 November–9 December 1950.** 72 pp. Geneva: 1951, Apr. [3*s*. 6*d*.; $0.45.]

The Conference was convened jointly by the World Health Organization (WHO) and the Commission for Technical Co-operation in Africa South of the Sahara (CCTA). It was attended by 38 members, the majority of whom are or have been directly concerned in the study of malaria in Africa, with the members of the WHO Expert Committee on Malaria, several of whom had such experience. The aims of the Conference were outlined by the Deputy Director-General of WHO as follows :—

" You are called upon to give scientific and technical opinions on what appear at the present time to be the principal problems in connexion with African malaria. In the first place, although it is generally admitted, in principle, that malaria control must be undertaken everywhere in the endemic and epidemic regions, is it advisable, from the point of view of the wellbeing of the populations themselves, to carry out control campaigns in hyperendemic regions ? If the reply is in the affirmative, what methods are to be adopted ? If, on the other hand, the conference is of the opinion that control campaigns in these hyperendemic regions are not to be advised, since they would deprive the populations concerned of their immunity, it will be necessary first of all to establish a precise definition of a hyperendemic region. And . . can it be said today that it is possible to intercept transmission of malaria in *A. gambiae* territories by the application of residual insecticides, and in this case, which insecticides and what doses and treatment-cycle should be adopted ? "

The direct answers to these questions are contained in the recommendations from which relevant extracts are :—

A. [The Conference] " 1. Recommends to governments responsible for the administration of African territories that malaria should be controlled by modern methods as soon as feasible, whatever the original degree of endemicity, and without awaiting the outcome of further experiments ;

" 2. Points out that the higher the degree of endemicity, the more important it is to establish a malaria-control organization so that there may be continuation of the work until the progress of control might allow relaxation without danger of an outbreak of malaria ;

"3. Points out, however, that should such an outbreak occur it would be possible to control it by the use of insecticides and antimalarial drugs with reasonable speed, avoiding undue suffering by the people ;

"4. Recommends that governments request the co-operation of WHO to advise on projects in one or more of the larger areas in which the adult populations appear to have a high degree of tolerance and to assess the benefits that malaria control may bring to the population, not only as regards the prevalence or effects of malaria, but also in relation to general health and to economic and social welfare."

B. "The conference, after studying the data available, is of the opinion that it is possible to bring about a very large reduction in the transmission of *gambiae* malaria by the application of residual insecticides in human habitations and other mosquito shelters, using either :—

"1. The gamma-isomer of benzene hexachloride at a dosage of not less than 10 mg per square foot (about 0·11 g per m^2) every three months, or

"2. DDT at a dosage of 200 mg per square foot (about 2·2 g per m^2) of the *p, p'*-product every six months.

"The conference is also of the opinion that it is possible to prevent transmission of *gambiae* malaria completely

"1. in some highland areas above 6,000 feet (1,830 m), and

"2. in areas where transmission is confined to relatively short seasons."

Although the definition of hyperendemic areas was made less important by the above recommendations a tentative classification was prepared for general consideration before final decision. The classification proposed was :—

"1. *Hypoendemic malaria* : spleen-rate in children 2–10 years of age, 0–10%.

"2. *Mesoendemic malaria* : spleen-rate in children 2–10 years, 11–50%.

"3. *Hyperendemic malaria* : spleen-rate in children 2–10 years, constantly over 50%; spleen-rate in adults, high.

"4. *Holoendemic malaria* : spleen-rate in children 2–10 years, constantly over 75% ; spleen-rate in adults, low ; it is in this type of endemicity that the strongest adult tolerance is found."

Discussions were not confined to these limited objects but covered the whole range of epidemiology and control of malaria in Africa. The mass of information put before the meeting is no more than briefly summarized in the Report. The distribution of malaria is outlined and the lack of reliable figures on morbidity regretted, though it is pointed out that there are difficulties in the collection of such figures even in highly developed communities. Natural infections with oöcysts or sporozoites of malaria have been found in 27 anopheline species though in some cases infections may have been non-human. In addition to the two main vectors the nine listed below are considered as being occasionally of considerable local importance, those marked with an asterisk being the more likely to cause a considerable amount of malaria :

A. brunnipes (Léopoldville)
A. funestus imerinensis (Madagascar)
**A. gambiae melas* (Sierra Leone, Nigeria, Gold Coast, Ivory Coast, French Guinea)
A. hancocki (Uganda, Nigeria, Belgian Congo)
A. hargreavesi (Southern Nigeria)
**A. moucheti moucheti* (Uganda, Belgian Congo)
A. nili (Nigeria, Sierra Leone, Belgian Congo)
**A. pharoensis* (Ethiopia)
**A. rufipes* (French West Africa, Sudan)

The Report includes a review of the bionomics of *A. funestus* and *A. gambiae*. The account of hyperendemic malaria and its economic importance is less factual than the foregoing though the conclusions are clear.

Many papers giving factual accounts of control were submitted, and conclusions from them are summarized in the Report. The tendency to exclude the possibility of using methods of larval control was deprecated, it being thought that every case should be judged on its merits. Successful control by DDT or BHC was reported from the Congo, Transvaal, Natal, Rhodesia, Mauritius and East Africa, while in Madagascar a mixture of DDT, BHC and Octochlor was used with success. The doses given in the recommendations above were advised after consideration of the conflicting reports on the efficacy of DDT in some places against *A. gambiae*, and examples of large-scale successful control through its application.

A few control schemes are commented on in brief detail ; these include the Ilaro Eradication Scheme, Nigeria.

Drug prophylaxis and therapy were discussed and the Conference considered that for the time being drug prophylaxis of both non-immunes and partially immunes will continue to play a permanent part in antimalaria measures, though it would be unwise to rely on it in preference to anti-mosquito measures. Various treatment régimes are reviewed for the guidance of workers in Africa but without material addition to existing knowledge. The drugs of choice for prophylaxis are said to be proguanil 0·1 gm. daily or chloroquine 0·3 gm. once weekly. The reports of overt attacks of *P. falciparum* malaria in persons said to be taking proguanil regularly are noted, but break-through has also been reported in persons under chloroquine or mepacrine prophylaxis. For partially immune subjects proguanil and chloroquine each in a single weekly dose of 0·3 gm. are advised. The Conference urged WHO to stimulate further trials of antimalarials both on non-immune subjects protected from reinfection and in the indigenous inhabitants of malarious areas.

The opinion is expressed that a specialist malaria service working within the framework of the public health authority, but with separate financial provision, should be encouraged in every African territory, and this service should develop sub-centres and be staffed by trained personnel adequately paid. This training is further considered and the need for its extension emphasized. Directive professional staff should obtain their initial training in malariology in Africa, preferably in a territory where an intensive and up-to-date programme of malaria control is actually carried out, while assistant and subordinate staff should be trained in their own regions. To help in this training the Conference urged the advisability of establishing courses in malariology in Africa, to be held annually in different countries on a system of rotation. *G. Macdonald*

World Health Organization. Technical Report Ser. No. 39. **Expert Committee on Malaria. Report on the Fourth Session, Kampala, Uganda, 11–16 December 1950.** 30 pp. Geneva. 1951, Apr. [1*s.* 6*d.* ; $0.20.]

The Committee held its Fourth Session in Uganda immediately after the Malaria Conference in Equatorial Africa [above] which its members attended. Much of its business was concerned with the results of the Conference, and it recommended that the Conference report should serve as a basic document for governments and for WHO in formulating policies on the control of malaria in Africa south of the Sahara. In addition to approving the entire report the Committee drew specific attention to the extreme importance of establishing malaria control organizations within each territory, and the necessity for their being of adequate size and staffed by adequately paid personnel. It recommends fellowships and training courses to assist in this, and it particularly endorses

the recommendation that malaria should be controlled as soon as feasible whatever the original degree of endemicity and without awaiting the outcome of further experiments. The necessity of observing the results of such work in hyperendemic areas is realized and it is suggested that WHO should co-operate in observations of this nature.

At its Second and Third Sessions the Committee had discussed the possibility of anopheline species eradication in the absence of natural barriers, and the matter had also been before the Conference. It is now stated that :—

" Few malariologists would now consider that the two concepts named are as distinct from each other as was considered the case in 1948. Experience since then has shown that the essence of an economic anopheline eradication scheme is prolonged persistent attack, and a school of thought maintains that prolongation of effort is more likely to lead to success than great concentration of effort in a short time, though the latter has been shown to be effective in some cases. On the other hand, the possibility of normal control schemes by modern methods securing a progressive diminution in anopheline breeding has seemed more hopeful than it once did. The two concepts thus tend to merge."

The Ilaro Eradication Scheme was considered an adequate original exploration of the subject and additional similar projects are to be hoped for. The principles on which such work as this should be carried out are briefly defined.

In discussing malaria control, the Committee has clearly had second thoughts on its previous rather emphatic support of residual insecticides as the sole economically effective means, and now states that it approves all types of control measures including, in some situations, such things as permanent drainage or filling. Despite this approval it believes that trial of residual spraying is justified however unfavourable the local conditions may appear to be.

The Report on the Second Session of the Expert Committee on Insecticides was considered and the Malaria Committee asked that further work be done on the specification of spraying apparatus and on some formulations of DDT and BHC.

Prevention of transport of anophelines by aircraft has been in front of many committees with conflicting recommendations according to their interests in quarantine or promotion of free flow of traffic. The Malaria Committee took the bull by the horns and attempted to define the risks and the means which might be taken to lessen them without going to either of the common extremes. Detailed proposals are given which are based on the designation of airfields rather than of countries as sources of possible transport and on the restriction of the right of demanding disinfestation to places at genuine risk. Among the latter the South Pacific area which is now free of anophelines is given special prominence.

The chapter on malaria therapeutics does not attempt to repeat the previous considerable review but the additional comments are made that quinine still has a place in the treatment of malaria ; that the 4-aminoquinolines, such as chloroquine and amodiaquine [camoquin], have been confirmed in their value for therapeutic and suppressive use ; the chief value of proguanil lies in prophylaxis but for the treatment of clinical cases in non-immunes, especially of *falciparum* malaria, it needs reinforcement with other more powerful schizonticides.

The malaria policy of WHO based on the Committee's previous reports is reviewed and endorsed as the results appear to justify its continuation. It is emphasized that active encouragement of malaria control is still needed and that WHO can do its best work by the despatch of demonstration teams to under-developed areas where there has, as yet, been no adequate demonstration of the utility of modern measures of control. The utility of international

courses in malariology is re-affirmed and the setting up of three malaria courses in 1952 is advised : in Africa, in South-East Asia, and the Eastern Mediterranean region. The extension of the fellowship system is also proposed. Co-operation with those concerned in economic and agricultural development is recommended and approval given to suggestions for a general FAO/WHO scheme for food production and malaria control for specified areas. *G. Macdonald*

KNUTSEN, B. Malaria tropica. En epidemi blant hjemvendte hvalfangere fra vestafrikakysten. [**Falciparum Malaria. An Epidemic among Norwegian Whalers returning from West Africa.**] *Nordisk Hyg. Tidskr.* 1951, Nos. 1/2, 23–36, 2 diagrams. [21 refs.] English summary.

A Norwegian whaling expedition was based on Cape Lopez in the French Congo in 1949, and the crew took mepacrine for prophylaxis against malaria. At the end of the operations most of the crew returned to Norway in the factory ship, and 5 cases of malaria occurred among them, but 78 men returned by air from Libreville in two groups which spent one and three nights there respectively. Libreville is situated in a marshy area, where malaria is endemic, but the men took no mepacrine although they were much bitten by mosquitoes. Cases of malaria appeared among them soon after their arrival in Norway ; 5 men who became ill in the first week had presumably been infected before going to Libreville. Forty-nine men in all developed malaria, which was of malignant tertian type in all cases. Signs of cerebral involvement appeared in four cases, two of which were fatal. Patients were treated with mepacrine in doses of 1·5 to 2·8 gm. given over a period of 4 to 7 days, followed by 1·8 gm. of plasmoquine over three days. Severe toxic effects were seen in 8 cases, and mild effects in 8 cases. Seven patients had a relapse, and were then treated with paludrine [proguanil] and plasmoquine. In view of the unusually large number of cases which occurred, suspicions arose as to whether the men had taken prophylactic mepacrine as ordered. Of 41 patients who were questioned, 19 had taken an insufficient dose, 11 had not taken any, and dosage with mepacrine had not been continued for 30 days after arriving home.

D. J. Bauer

SHORTT, H. E., FAIRLEY, N. H., COVELL, G., SHUTE, P. G. & GARNHAM, P. C. C. **The Pre-Erythrocytic Stage of** *Plasmodium falciparum*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Feb., v. 44, No. 4, 405–19, 5 figs. (4 coloured) on 2 pls. & 2 charts. [27 refs.]

In this paper the authors give a complete account of the pre-erythrocytic development of *Plasmodium falciparum*, which was briefly described in a preliminary note two years ago [this *Bulletin*, 1950, v. 47, 193].

Among the 2,000 laboratory-bred mosquitoes used in the experiment, 75 per cent. belonged to *Anopheles maculipennis atroparvus* and 25 per cent. to *A. quadrimaculatus*. After the mosquitoes had fed on a patient infected with a Rumanian strain of *P. falciparum*, when numerous gametocytes were present, dissection of some (30) of the insects revealed an infection rate of 93 per cent. A healthy volunteer (No. 1) was then subjected to the bites of the mosquitoes three days in succession, the numbers fed being 350, 95 and 325 respectively (770 bites in total). The infectivity of the mosquitoes was checked by allowing 370 to bite a patient on four successive days, after which he developed malaria.

For three days following the last exposure to infecting bites, the volunteer was subjected to haematological and biochemical tests, and blood films were examined for malaria parasites with negative results. On the next day (140 hours after the first exposure to mosquito bites) biopsy of the liver was

performed after laparotomy, and a piece measuring roughly ⅜ cub. in. was excised and fixed in Carnoy's fluid. One day later (7 days after the first exposure) ring forms of the parasite were found in thick blood films, after which the volunteer underwent a course of treatment, which resulted in a radical cure. With the view to determine the time required for the completion of the pre-erythrocytic schizogony and the invasion of the blood stream, a 2nd volunteer was inoculated intravenously with the blood of the 1st volunteer 135 hours after the latter had been exposed to mosquito bites. The 2nd volunteer developed malaria 8 days after the inoculation, showing that the pre-erythrocytic development, with the liberation of merozoites, may be completed in less than 135 hours after mosquito transmission of malignant tertian malaria.

Sections of the liver (stained by the colophonium-Giemsa method) revealed stages of schizogony of the parasite, which were about 4, 5 and 6 days old, corresponding to infections initiated in the 1st volunteer by mosquito bites on three successive days. All the schizonts were situated within the parenchyma cells.

The 4-day forms are somewhat oval, measuring about 31 μ in largest diameter, and show a tendency to produce lobose projections. They contain numerous nuclei (some dividing), measuring 1·5 μ across. The host cell is only slightly altered, and its nucleus is pushed to the periphery. The 5-day schizonts measure 50 μ in longest diameter. At this stage the production of lobes is more marked and there is a tendency on the part of the cytoplasm to break up into portions resembling cytomeres. The number of nuclei, which are now smaller (about 0·8 μ), has increased considerably and many are actively dividing. The 6-day schizonts measure upwards of 60 μ ; they now form a complicated system of lobes, so that their shape is highly irregular, as shown in an illustration accompanying the text of a model reconstructed from serial sections through one schizont. At this stage the schizonts have reached maturity : they are segmenting into merozoites, measuring about 0·7 μ in diameter, and are either ready to rupture or are already releasing merozoites into the surrounding sinusoids. The number of merozoites in a mature schizont was estimated to be 40,000. The parasites are surrounded by a limiting membrane, the nature of which remains unknown. There is no reaction to the presence of schizonts on the part of the liver, but as they increase in size they compress the neighbouring cells. The appearance of the pre-erythrocytic schizonts is depicted in an excellent coloured plate.

A comparison with the pre-erythrocytic development of *P. vivax* and *P. cynomolgi* shows that in *P. falciparum* this phase is of shorter duration, merozoites being liberated on the sixth day, instead of the eighth day. However, during this period the mature schizont of *P. falciparum* grows to a larger size and produces a much greater number of smaller merozoites. There is also presumptive evidence that—unlike *P. vivax* and *P. cynomolgi*—*P. falciparum* does not continue its development in the tissues beyond the pre-erythrocytic phase. *C. A. Hoare*

SHUTE, P. G. & MARYON, M. **A Study of Gametocytes in a West African Strain of *Plasmodium falciparum*.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Feb., v. 44, No. 4, 421–38, 4 graphs. [12 refs.]

This paper deals with the conditions under which gametocytes are produced in a West African strain of *Plasmodium falciparum*, which has been passaged in the course of 17 months through 85 patients at Horton Mental Hospital. Infection was successfully produced by blood inoculation (19), by mosquito bites (24), and by intravenous injection of sporozoites (42). All the patients were given antimalarial drugs, and are divided into the following groups according to the treatment received : *A*—comprising 24 patients who were

treated with subtherapeutic doses 1 to 12 days after onset of fever and subsequently relapsed ; *B*—4 patients who were treated on the 5th day after onset of fever and did not relapse ; *C*—12 patients who had a full course of treatment 1–5 days after onset of fever and relapsed ; *D*—21 patients who had a full course of treatment 1–4 days after onset of fever and did not relapse ; and *E*—23 patients who were successfully protected by prophylactic drugs. (Since they failed to develop fever or parasites, this group is not considered further.)

In group *A*, gametocytes appeared in the majority (19) of patients : in some 9–14 days after the beginning of the primary attack, in others 10–13 days after recrudescence. Eight of these patients produced infections in mosquitoes (*Anopheles stephensi*), ten failed to infect any : some because the density of gametocytes was too low, others because only female forms were present. In group *B*, in which the disease was cured, 3 patients showed small numbers of crescents, represented in two of them by macrogametocytes only, while in one the number was sufficient to produce a slight infection in mosquitoes. In group *C*, treatment was unsuccessful, and all the patients showed numerous crescents 4–16 days after recrudescence (26–40 days after onset of primary attack). In group *D* the cure was radical and no crescents developed over a period of 3 months.

The authors note that their findings correspond to the conditions observed in a non-endemic area of M.T. malaria among a non-immune population, in that crescents are produced among persons of various age-groups throughout the year. In the present series, 55 per cent. of all the cases developed gametocytes in appreciable numbers. Crescents were never found in cases where antimalarial drugs cured the disease in the primary attack, but large numbers invariably developed in patients who recrudesced or relapsed after administration of sub-therapeutic doses of antimalarials, which appear to stimulate the production of sexual forms. From these observations it is concluded " (1) that patients leaving hospital should be given a course of a gametocytocidal drug, *e.g.*, proguanil, between the 14th and 21st day after the last day of fever ; (2) that a clinical and radical cure of a primary attack . . . is of major importance epidemiologically in preventing mosquitoes from becoming infected ".

In the course of this investigation, it was noted that female crescents always appeared before the male crescents and persisted after the latter had disappeared. Evidence is produced of the development of gametocytes from asexual parasites present in the blood during the remissions between attacks. In view of the importance of determining the sex of gametocytes and the difficulty of differentiating them in thick blood films, a method facilitating their identification in thin films is described. *C. A. Hoare*

EJERCITO, A. & URBINO, C. M. **Flight Range of Gravid and Newly Emerged Anopheles.** *Bull. World Health Organization.* Geneva. 1951, v. 3, No. 4, 663–71, 8 figs.

This paper describes an experiment, carried out in 1937, on the range of flight of *Anopheles minimus* var. *flavirostris* and other species, in a hilly region of the Philippines. The results of previous work in other types of country are referred to. Adult mosquitoes were stained with aqueous solutions of stains, by means of an atomizing sprayer, and were released an hour later, when the stain had dried. Captures of mosquitoes were made mostly in animal-baited traps located in different directions from the point of release, but also by hand collection in certain known harbourages along banks of streams. The mosquitoes used were young adults bred out from a cage partly submerged in a stream, and

stained with 1 per cent. methylene or indigo blue ; and gravid and fed females from traps, stained with 2 per cent. fuchsin. For stain testing the captured mosquitoes were lined up on a white porcelain plate and a solvent consisting of three parts glycerin, three parts alcohol and one part chloroform, was dropped on to each. Any traces of stain showed up clearly under a binocular microscope.

The number of "bred-out" mosquitoes marked and released between 15th February and 1st April 1937 was 3,630, and that of trapped specimens was 2,684. Out of a total catch of 71,311 mosquitoes, only nine were marked, eight of which were "bred-out". All were females and all, except one bred-out *Anopheles vagus* var. *limosus*, were *A. minimus* var. *flavirostris*. Full details of place of capture, with distance and compass bearing from place of release, as well as wind direction and velocity and other weather conditions, are given for each of the nine marked insects recovered. The distance varied between 640 metres and 2,016 metres, and the direction was usually that of the prevailing wind. Where deviation from this direction occurred, the authors explain it as the result of wind eddies caused by the local topography. The experiment was carried out in the dry season so that the effect of humidity, temperature and precipitation on mosquito flight was not discovered.

A. J. P. Goodchild

JEFFERY, G. M., EYLES, D. E. & YOUNG, M. D. **The Comparative Susceptibility of *Anopheles quadrimaculatus* and Two Strains of *Anopheles albimanus* to a Panama Strain of *Plasmodium falciparum*.** *J. National Malaria Soc.* 1950, Dec., v. 9, No. 4, 349–55, 3 figs.

The following is the authors' summary :—

"When fed simultaneously, two strains of *Anopheles albimanus* proved to be more susceptible than *A. quadrimaculatus* to a Panama strain of *Plasmodium falciparum*. Only about 78 per cent as many *A. quadrimaculatus* became infected as Panamanian *A. albimanus*, and the average oöcyst intensity in the Panama strain was 7·2 times that in *A. quadrimaculatus*. About 93 per cent as many *A. quadrimaculatus* became infected as *A. albimanus* from the Florida Keys, and the average oöcyst intensity in the Florida strain was 2·4 times that in *A. quadrimaculatus*.

"In comparing the two strains of *A. albimanus*, about 94 per cent as many of the Florida Keys strain became infected, and the Panama strain averaged 1·8 times as many oöcysts per gut over the Florida strain.

"There was probably no refractory portion of the Panama *A. albimanus* population but it appears quite certain that about 20 per cent of the *A. quadrimaculatus* population was refractory."

MUIRHEAD-THOMSON, R. C. **The Distribution of Anopheline Mosquito Bites among Different Age Groups. A New Factor in Malaria Epidemiology.** *Brit. Med. J.* 1951, May 19, 1114–17.

In Jamaica *Anopheles albimanus*, the vector of malaria, bites man actively outdoors as well as indoors with a sharp peak of biting at sundown and another at dawn. Initial random observation suggested a striking difference between the frequency of bites on adults and children. Planned observations were then carried out to study this frequency, with the following results :—

TABLE I.

Distribution of A. albimanus *Bites Among a Jamaican Negro Family at Ferry, near Kingston, Jamaica.*

	Sex and age		Number of bites recorded	
			Summer weather (5 collections)	Rainy season (1 collection)
Mr. Bailey	M	36	103	199
Mrs. Bailey	F	30	25	49
Marjorie	F	9	23	40
Donald	M	8	45	61
George	M	5½	8	13
Thelma	F	5½	18	10
Malcolm	M	2½	18	15
Linette	F	1	0	2

A very marked anopheline preference for older people is clear, and the difference was not due to any protection of the infant, either intentional or incidental.

Observation at night on sleeping infants confirmed the trend, the adult male getting 81 bites to three on the infant. The same marked preference by *A. albimanus* was shown on two Jamaican families of East Indian origin and a briefer form of observation was later carried out in Trinidad in areas infested by *A. aquasalis* and *A. bellator*. The results suggested that those anophelines showed a similar preference, biting frequency being directly related to the age of the individual.

This preference is doubtless associated with the comparative rarity of malarial infection in infants in the West Indies and may require revision of the commonly accepted idea that young children are the chief sources of infection of anophelines. It is possible that similar preference by anophelines in other areas might account for some of the hitherto unexplained problems of malariology.

[Many of the attempts to solve problems of the epidemiology of malaria have been concerned with the frequency of infections in infants and children as, for instance, in papers by COVELL [this *Bulletin*, 1950, v. 47, 1147] and the reviewer [MACDONALD, *ibid.*, 907, 915]. It has normally been assumed that mosquito bites were distributed at random among the population. This striking demonstration that in one important geographical area the assumption is untrue must require a revision of judgment on several problems. Repetition of the work in other areas would be of great value. Immunity from bites must be considered independently of immunity from infection.] *G. Macdonald*

HERIBERTO TÓRRES, J. & MOSCOSO CARRASCO, C. Distribución del Anofeles pseudopunctipennis en Bolivia. [**Distribution of** *Anopheles pseudopunctipennis* **in Bolivia.**] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 7–11, 1 folding map.

HEINKEL, K. Die Wahrscheinlichkeit einer Malaria-diagnose aus dem Ausstrich und eine Methode zur Darstellung des zeitlichen Ablaufes der Schizogonie bei der Malaria. [**The Probabilities of Diagnosing Malaria in a Blood Film and a Method of Estimating the Duration of the Cycle of Schizogony in Malaria.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1950, Sept., v. 2, No. 2, 246–61, 19 figs. [12 refs.]

The first part of this study is concerned with the accuracy of counting parasite numbers in blood films. The author has adopted the somewhat novel procedure

of counting the number of microscopic fields that have to be traversed (taking them in a definite order) to come to each parasite, continuing until a fixed number of parasites, in this case 100, has been attained. With a satisfactory technique "number of fields" should have an exponential distribution. This is tested by comparing in seventeen different preparations the actual and expected values (i) of the mean deviation in excess, and (ii) of the greatest value in the series of 100. He concludes that the agreement is satisfactory and this is on the whole true, though, in fact, large values are rather more frequent than would be expected by chance. [This method provides an alternative to counting the numbers of parasites in equal fields of fixed size and testing the agreement with a Poisson distribution.]

On the assumption that a cubic millimetre of blood can be examined in 320 minutes, and that there are p parasites per cmm. the probability of a negative result in t minutes is $e^{-pt/320}$. The probability is tabulated for p=1, 5, 10, 100, 1,000, 5,000 and t=1, 2, 5, 10, 15, 20, 30, 60. With $p \geqq 100$ and $t \geqq 20$, the chance of a negative result is negligible. On the other hand, with p=1 and t=60, the chance of a positive result is only 0·17. Thus a negative result can never definitely exclude malaria ; it can only rule out (in practice) parasite densities above a certain level.

In the second part of the study the method is applied to examining the changes in the percentage distribution by type of parasite numbers in the course of the asexual schizogonic cycle and comparing the results with the course of the temperature curve. Films were prepared from blood taken at intervals of 3 hours during the day ; the total length of the cycle was estimated to be 51 hours. The results were used to estimate the duration of the different phases of the cycle. The time intervals obtained differ, particularly in the first stage of development, from those given by SCHAUDINN, who did not, however, use a systematic statistical method. [This seems to be the first time that properly controlled statistical counts have been used in this field of study.]

J. O. Irwin

LE VAN HUNG. Paludisme et grossesse à Saïgon. [**Malaria and Pregnancy in Saigon.**] *Rev. Paludisme et Méd. Trop.* 1951, Apr. 15, v. 9, No. 83, 75–112. [Bibliography.]

It had long been recognized in Saigon that malaria was more than twice as common in pregnant women as in the general population, and among the 1,255 pregnancies dealt with in this paper, 135 of 560 mothers examined were found to have positive blood films, 130 being found post-partum and 5 ante-partum. A better attendance at antenatal clinics would probably have increased the last figure. Two-thirds of the cases came from the south of Vietnam and about two-thirds of all the infections were due to *P. falciparum.* No less than 49 per cent. of parturitions in the infected persons were premature and there were 7 per cent. of abortions also. Labour was more prolonged and post-partum haemorrhage more common, and foetal distress was noticeable.

In the infants of 67 infected mothers, the placenta, cord or foetal blood was found positive in 24 cases, *i.e.*, 36 per cent. The species of parasite was the same in nearly every case and each variety was represented in about the same proportions as among the total group of mothers. Gametocytes were found in the spleen or liver of the foetus in eight cases, proving the intra-uterine development of the parasite. The fact that only a proportion of foetal infections occurred is attributed to rarity of placental lesions (only observed twice), without which the parasites cannot pass the barrier.

Pregnancy favoured relapses especially in the third month, but quinine treatment never produced abortion. Post-partum malarial fever started on

the third or fourth day and was only severe when associated with puerperal infection. Treatment of congenital malaria must be thorough, though the disease as seen by the author does not appear to be severe. *C. C. Chesterman*

CHAUDHURI, R. N. & CHAKRAVARTY, N. K. **A Fatal Case of *P. falciparum* Malaria.** *Indian J. Malariology.* 1950, June, v. 4, No. 2, 111–14, 4 pls.

This case relates to a man of 75 in Calcutta who, although weak and emaciated, walked to hospital and gave a history of fever and diarrhoea of 8 days' duration. His blood showed an unusually heavy infection with *P. falciparum* and severe anaemia. The spleen was not palpable : despite intensive proguanil therapy, including intravenous injections (he received 1·4 gm. in about 24 hours) the patient died on the day after admission. Parasites were found at autopsy in the capillaries of the heart muscle, spleen, liver, small intestine, kidneys and brain. The diarrhoea, cardiac weakness and drowsiness are attributed to this blocking of capillaries.

A notable feature was an increase of the leucocyte count from 16,000 per cmm. to 39,000 per cmm. in 24 hours : 80 per cent. of the cells were neutrophiles. The possible causes of this are discussed, together with the presence of myeloblasts found in the heart blood.

The authors also discuss the question of whether quinine or mepacrine could have saved this patient. They refer to COVELL's observations that proguanil is not sufficiently rapid in action to warrant its use in extreme urgency [this *Bulletin*, 1950, v. 47, 11]. *H. J. O'D. Burke-Gaffney*

SHANNON, J. A. **The Study of Antimalarials and Antimalarial Activity in the Human Malarias.** Reprinted from *Harvey Lectures Series, XLI, 1945–1946*, 43–89, 12 figs. [38 refs.]

This article is from the Harvey Lectures Series XLI, 1945–46 and embodies the material of a lecture delivered on October 25th, 1945. The results described are those obtained in a co-operative effort by groups of workers in an endeavour to improve the basis of antimalarial therapy in all its aspects. Most of them were unpublished at the time of delivery of the lecture but have since appeared and been reviewed [this *Bulletin*, 1948, v. 45, 956–63]. The early tissue phase of *P. vivax* and *P. falciparum*, although taken for granted, had not then been described by SHORTT and colleagues. As the author indicates, the course of events in human malaria from sporozoite inoculation, through the tissue and erythrocytic phases to the clinical attack appear to be conditioned by a number of factors such as the species of malaria, immunity and treatment. In the design of therapeutic tests the mechanism of relapse after treatment, about which little was known, had also to be considered. To account for recurrent clinical attacks the presence of resistant erythrocytic forms or persistent tissue forms was suggested. Evidence in favour of the latter view [now confirmed as correct] was based on experimental results. Early experiments were made on blood-induced infections and the suppressive effect of drugs was then studied. The patients ranged in age from 15 to 60 years and suffered from syphilitic involvement of the central nervous system but had no previous history of malaria. After examination for fitness to undergo the tests, each patient was inoculated intravenously with ½ million parasites taken from another patient infected with the McCoy strain of *P. vivax* on the fourth or fifth day of fever. Each was allowed 75 hours of fever in excess of 103°F. Administration of the antimalarial was begun and continued in such a way as to maintain a steady plasma level of drug for 4 days. The effects obtained were divided into 3 classes.

Class I.—In which parasitaemia and fever were reduced less than 50 per cent., *i.e.*, little or no effect.

Class II.—In which fever and parasitaemia were reduced more than 50 per cent., the course of the disease being altered but infection not eradicated, with spontaneous recurrence within 14 days after last effective plasma drug concentration, *i.e.*, temporary effect. (The period of 14 days referred to the McCoy strain only.)

Class III.—In which parasites were absent from thick blood smears for at least 14 days after an effective concentration of drug in the plasma and the host was shown to be susceptible by re-inoculation, *i.e.*, permanent effect.

The part played by immunity in these tests was ruled out by giving the drug early in the course of the disease. Quinine was chosen as the reference drug because it could easily be estimated, its effects were known, it was rapidly excreted, and there was a good correlation between plasma levels and therapeutic effect, although not between oral dosage and therapeutic effect. The McCoy strain used showed a constant susceptibility to quinine and made possible the comparison with other antimalarial drugs. In support of the belief in a cycle other than erythrocytic as a result of mosquito infection, it was shown that the blood forms in that case were just as susceptible as those which followed blood-induced infections. In strains other than McCoy the period between primary attack and relapse was sometimes much shorter and this property proved valuable in the study of curative action since the follow-up period was reduced. Experimental data indicated that the cause of the earlier relapses was due to the erythrocytic parasites being less susceptible to drugs but not to such an extent that the asexual cycle was interrupted. Antimalarial agents were examined for prophylactic, suppressive and curative action.

In discussing the general principles of drug treatment in malaria the importance is emphasized of a drug reaching the site of action in sufficient concentration over a period of time to be effective. Efforts were therefore directed to relate concentration in plasma to antimalarial activity and to the processes which condition the plasma level of drug attained. Chemical methods were developed for this purpose and also to study the metabolic fate of drugs in the body. In the case of the four principal cinchona alkaloids it was demonstrated that antimalarial activity was closely related to the plasma concentration and that there was considerable variation in effective levels among them. The oral dosage of each required to produce these levels did not differ greatly from one another and the practical conclusion was reached that large supplies of cinchona products for the production of Totaquine could be made available from South American sources. As with cinchona alkaloids the activity of atebrin [quinacrine, mepacrine] was correlated with plasma concentration and the importance of a loading dose for rapid attainment of the required plasma level and speedy clinical effect was established. The wide range in plasma levels in patients receiving the same dosage of quinacrine was noted. As a result the method of administration was put on a sounder footing, and some basic principles were established. In the search for new drugs it was recognized that the action on erythrocytic and on tissue forms might or might not be comparable, so that doubt was thrown on the method of using blood-induced infections in the search for curative agents in *vivax* malaria. Subsequent studies, especially with chloroquine [resochin], showed that the first assumption was incorrect. The use of avian malarial infections in this type of investigation proved of little help. The reduction in the number of relapses in *P. vivax* infections following treatment with plasmoquine in combination with quinine noted by SINTON and BIRD [this *Bulletin*, 1929, v. 26, 14] served as a further lead in the quest for new curative drugs in this infection, and an intensive study of other 8-aminoquinolines was undertaken. [Subsequently pentaquine and isopentaquine were introduced.]

A detailed study is also given of the factors affecting cinchonine as an antimalarial, including a description of its metabolic products. *J. D. Fulton*

PIZZILLO, G. L'impiego della chinina-etiluretano per via endovenosa nelle fasi febbrili dell'infezione malarica. (Storia, pregiudizi, azione benefica della chinina.) [**The Intravenous Use of Quinine-Ethylurethane in the Febrile Phases of Malaria. (History and Advantages of, and Prejudices against, Quinine.)**] *Riv. di Malariologia.* 1951, Feb., v. 30, No. 1, 1–15. English summary.

In 1638, a Spanish high official in Peru learnt that some neighbouring villagers treated fever with certain powders prepared from tree bark. He sent samples to the Chief Justice at Lima and suggested that the Viceroy might give the remedy to his wife, the Countess of Chinchon, who had been ill with pernicious fever for some time in spite of the valiant efforts of her doctor. The Court Physician consulted other colleagues and they advised against the use of this "witchcraft" remedy. The Head of one of the Convents then blessed the powder and authorized its use, with immediate beneficial result. On her return to Spain, the Countess helped various friends to recover from their fevers, by giving them a supply of what became known as "the Countess's powder". In 1649, the Jesuits introduced this powder into Rome, where it became successively known as the "Jesuit's powder" and then the "Cardinal's powder". Talbor, in England, cured Charles II of his persistent fevers, by giving him a secret remedy which he later, in 1679, used successfully on the Grand Dauphin of France : the latter paid for Talbor to divulge the composition of his remedy which turned out to be a strong quinine wine. From 1700 onwards, quinine dosage and indications became systematized in Italy, where Torti taught that quinine acted "*non in febrem sed in solam causam febris*". In England, because of some failures [Charles II is believed to have died of malaria], the drug had fallen into disrepute until rehabilitated and re-established about 1770. It was Linnaeus who introduced the name "*Cinchona officinalis*" in honour of the Countess who first brought the drug to Europe. [Many of the legends about cinchona are now discounted : see this *Bulletin,* 1951, v. 48, 304.]

Until the alkaloid was extracted, large doses of the bark powder had to be given. Quinine forms neutral salts, which are nearly insoluble in water, but the view is no longer held that the more soluble salts, *e.g.*, the hydrochloride rather than the sulphate, must be given by mouth. In fact, both MISSIROLI and SINTON have given reasons why the sulphate is the more suitable. Quinine is not suitable for subcutaneous injection ; for the intramuscular and the intravenous routes, the hydrochloride is combined with ethylurethane in distilled water. Pizzillo has used such intramuscular and intravenous injections on 250 cases of malaria without causing any pain or other complaint. The intravenous route is useful when a rapid action is indicated and Pizzillo advises that adrenalin should be given intravenously at the same time in such cases. He has treated 40 cases in this way without a failure : he thinks that failure is often due to the use of solutions which are too acid and too viscous. Pizzillo's solution may lose its clearness in cold weather but it only needs a little warming-up at 38°C. for the crystals to go back into solution. *J. Cauchi*

DE ROTHSCHILD, B. & LÉVY, G. Recherches sur la quinacrine chez la rate gestante. [**The Effect of Mepacrine on Pregnant Rats.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 65–8. [12 refs.]

The effect of malaria on pregnancy has frequently been described, and infant mortality increases as a result of the infection. Malformations of the foetus,

however, have apparently not been described. In view of the fact that some drugs reach the foetus during intra-uterine life the authors, using a small series of pregnant rats, investigated the effect of subcutaneous injections of quinacrine [atebrin, mepacrine] both before and during pregnancy. This substance is known to antagonize certain of the B_2 group of vitamins and to inhibit certain enzyme systems [this *Bulletin*, 1945, v. 42, 252]. The animals were fed on a diet containing starch, casein, arachis oil, carrots, calcium lactate and added vitamins A, B_2, D and E. Some rats received additional riboflavin without apparently influencing the course of events. As a result of drug injection the rats lost condition and lesions occurred in and around the site of injection, but no other manifestations of note were present. It was observed that as a result of drug treatment the number of embryos was reduced and some abortions occurred, not, it was thought, as a result of the direct action of the drug on the uterus. Malformations in the foetuses (admittedly few in number) were not detected. The drug was shown to be present in foetal liver in about 1/60 the amount present in the maternal organ. The formation of vitamin B_2 in the liver of the former appeared to be unaffected by quinacrine.

J. D. Fulton

BRUCE-CHWATT, L. J. **Evaluation of Synthetic Anti-Malarial Drugs in Children from a Hyperendemic Area in West Africa.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Apr., v. 44, No. 5, 563–92, 8 graphs. [36 refs.]

The subjects of this series of trials were 245 African children of 6 to 10 years of age attending two schools in a semi-rural suburb of Lagos, Nigeria. All these children had malaria parasites in demonstrable numbers in the peripheral blood at the commencement of the experiment, approximately 98 per cent. of the infections being with *P. falciparum*.

The children were divided into 4 groups, the first 3 receiving treatment with proguanil, mepacrine and chloroquine respectively, whilst the fourth was left untreated for comparison purposes. Each of the first 3 groups was further sub-divided into 2 sections, one of which received a single suppressive dose of the drug, the other a full therapeutic course. The régimes were :—

Drug	Single suppressive dose	Therapeutic course
Proguanil	0·3 gm.	0·5 gm. daily for 5 days (total 2·5 gm.).
Mepacrine	0·3 gm.	0·5 gm. on first day, 0·2 gm. daily for 4 days (total 1·4 gm.).
Chloroquine (diphosphate)	0·5 gm. (0·3 gm. of base)	0·75 gm. on first day, 0·25 gm. daily for 2 days (total 1·25 gm. or 0·75 gm. of base).

The therapeutic dosage was calculated at approximately half that usually prescribed for adults.

The effects were studied by periodical determinations of the spleen rate, average enlarged spleen, parasite rate and parasite density carried out over a period of 9 weeks. Oral temperatures were also recorded daily during the first week. In all respects children with *P. falciparum* infections responded most quickly when treated with chloroquine, closely followed by those under mepacrine ; the response of those in the proguanil series was less rapid. It was observed that *P. falciparum* infections yielded to schizonticidal drugs less

easily in some children than in others. This difference in response was most frequent in the proguanil series and less so in the mepacrine series, while in the chloroquine series no such variation was observed. With all the drugs tested the clearance rate of asexual parasites from the peripheral circulation was more rapid in children with palpably enlarged spleens than in others, and was not apparently related to the parasite density found before drug administration. The presumed relapse rate of *P. falciparum* infections 2 months after treatment with proguanil was 25 per cent. higher than after mepacrine or chloroquine therapy. None of the 3 drugs had any apparent effect on the rate or density or morphology of gametocytes of *P. falciparum.* Mosquitoes fed on gametocyte carriers of *P. falciparum* treated with mepacrine or chloroquine were able to transmit the infection, whereas no infection occurred with those fed on carriers treated with proguanil. All these findings were in accordance with those recorded by COVELL and his colleagues as the result of their observations on infections with a West African strain of *P. falciparum* [this *Bulletin*, 1949, v. 46, 325, 437, 703].

Infections with *P. malariae* were too few to warrant comparison of the action of the 3 drugs tested, but in general the response was slower than with other species of *Plasmodium.* The few *P. ovale* infections treated cleared up rapidly with all the drugs tested.

[It is sometimes stated that the relative merits of antimalarial drugs can be properly tested only in non-immune persons living under conditions which preclude reinfection. The results recorded in the paper under review show that extremely valuable data on the subject may also be obtained by carefully planned experiments among the children of indigenous populations of malarious areas. It is to be hoped that further experiments on these lines will be undertaken not only in Nigeria but also in other countries where malaria remains a major problem.] *G. Covell*

CHAUDHURI, R. N., RAI CHAUDHURI, M. N., GHOSH, S. & DUTTA, B. N. **Comparison of the Action of Paludrine (Proguanil), Chloroquine and Camoquin in Single Doses.** *Indian J. Malariology.* 1950, June, v. 4, No. 2, 135–49, 10 figs. [11 refs.]

This investigation was undertaken with the object of determining the most suitable single-dose treatment for malaria in rural areas. The tests were carried out on 75 patients, comprising 31 *P. falciparum* cases, 40 *P. vivax*, 2 mixed (*P. falciparum* and *P. vivax*) and 2 *P. malariae.* They were divided into 3 equal groups, the first receiving 0·5 gm. proguanil hydrochloride, the second 0·5 gm. chloroquine diphosphate base, and the third 0·5 gm. camoquin base. In the case of all patients treated with chloroquine or camoquin and in 84 per cent. of the proguanil group, the peripheral blood was cleared of parasites within 3 days. All 3 drugs were effective in producing clinical cure, chloroquine being the most rapid in action, proguanil the least rapid and camoquin occupying an intermediate position. The patients were under observation for periods of 1 to 4 months, during which fever recurred in 9 of the proguanil group, 5 of the camoquin group and 2 of the chloroquine group.

The authors conclude that while all three drugs are effective for single-dose treatment of malaria under rural conditions, chloroquine is the most suitable, as being the most rapid in action and the most likely to effect radical cure. *G. Covell*

HAMILTON, C. S. P. **Camoquin and Chloroquine in the Treatment of Malaria.** *Indian J. Malariology.* 1950, June, v. 4, No. 2, 209–32. [13 refs.]

The observations recorded are based on a study of 1,327 microscopically diagnosed cases of malaria occurring over a period of 3 years in a malarious

jungle area in Assam. Rather more than half the infections were with *P. falciparum*, the remainder with *P. vivax*. The régimes employed were : (i) chloroquine 0·5 gm. single dose and 0·5 gm. initial dose followed by 0·25 gm. on each of the 3 following days ; (ii) camoquin 0·5 gm. single dose and 1·0 gm. single dose ; (iii) proguanil 0·3 gm. daily for 10 days and 0·4 gm. daily for 3 days ; (iv) proguanil 0·3 gm. daily for 10 days plus pamaquin 0·03 gm. daily for 5 days, and proguanil 0·4 gm. daily for 3 days plus pamaquin 0·02 gm. daily for 3 days. A number of similar régimes were also tried followed by prophylaxis either with camoquin 0·5 gm. every second week or proguanil 0·1 gm. bi-weekly.

The author concludes that both camoquin and chloroquine are useful remedies and that even by themselves they have a definite place in the treatment of *P. vivax* infections, but that it is necessary to continue prophylaxis after a full course of treatment in order to guard against relapses and reinfections. The single dose treatment with 0·5 gm. camoquin followed by a fortnightly dose of the same quantity as a prophylactic is a powerful therapeutic agent. A course of proguanil followed by proguanil prophylaxis is considered to be equal in its action to any other antimalarial drug in the treatment and prevention of *P. falciparum* infections. The importance of economic considerations in the treatment and prophylaxis of malaria among labour forces is emphasized.

G. Covell

HULSHOFF, A. A. **Treatment of Benign Tertian Malaria with Nivaquine-Plasmoquine ; Results in the Years 1948–1949.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1951, Mar., v. 3, No. 1, 91–3. Discussion 93.

At a previous meeting the author reported results of treating *vivax* malaria with Nivaquine C, a French resochin preparation almost identical with chloroquine, in a dosage of 100 mgm. thrice daily for 5 to 7 days, followed by pamaquin naphthoate 18 mgm. thrice daily for 5 or 6 days. The relapse rate in this group was 30 per cent. as compared with 53 per cent. in those treated with Nivaquine C only, and 27 per cent. in those on proguanil followed by pamaquin [this *Bulletin*, 1950, v. 47, 806].

In the present series, out of 84 patients with *vivax* malaria treated with the same Nivaquine C-pamaquin course as before, six experienced a total of 7 relapses (7 per cent.). The two series were, however, not comparable, since the first consisted chiefly of ex-prisoners-of-war or ex-internees of Japanese civilian camps in Indonesia who had suffered from many untreated relapses and who were badly undernourished, whereas in the present series the great majority were repatriated soldiers who had nearly all been under suppressive medication, had received prompt treatment for their primary attack and were well nourished. [As remarked by Professor N. H. SWELLENGREBEL in the discussion which followed, though malnutrition may have played a part in determining the greater incidence of relapses in the first series, the other two factors mentioned might be expected to exert an opposite effect.] Dr. Hulshoff drew a comparison between his results and those recorded by MOST *et al.* in the case of American soldiers returned from the Pacific theatre of war, 80 per cent. of whom relapsed after treatment with chloroquine, and contended that his figures provided convincing proof of the anti-relapse value of combinations of schizonticidal drugs with pamaquin.

G. Covell

BAMI, H. L. **Studies in Sulpha-Biguanides : Some N^1-Aryl-N^5-p-(2-Pyridyl)Phenylsulphonamide-Biguanides.** *Indian J. Malariology.* 1950, June, v. 4, No. 2, 233–4.

LANDQUIST, J. K. **Synthetic Antimalarials. Part XLVI. Some 4-Dialkylamino-alkylaminoquinoline Derivatives.** *J. Chem. Soc.* 1951, Apr., 1038–48, 3 figs.

THOMAS, A. **The Use of Coconut Logs in the Reclamation of Tidal Areas by Controlled Tipping.** *Med. J. Malaya.* 1951, Mar., v. 5, No. 3, 236–8, 7 figs.

GAUD, J. & MECHALI, D. Place de la lutte anti-imaginale dans l'action anti-paludique au Maroc. [**Place of Anti-Mosquito Measures in Malaria Control in Morocco.**] *Congrès Internat. Hyg. et Méd. Méditerranéennes Alger, 3, 4, 5, Avril 1950.* 247–51.

Following the success of DDT house-spraying for malaria in Italy and elsewhere it was introduced into Morocco, where the usual dosage schedule was employed. It was found, however, that the DDT was singularly unsuccessful, in that suppression of mosquitoes seldom lasted as long as two months. Various preparations of DDT were used (the best was a 50 per cent. wettable powder) and the application was carefully supervised, but the results were definitely less satisfactory than reported elsewhere, possibly because of the very hot, dry climate.

Another reason which requires the continued use of antilarval measures is that malaria must be suppressed in towns and villages. Often, the number and extent of breeding sites are small compared to the numerous villas and houses to be treated, so that a small intelligent staff can deal with them whereas a large staff is necessary for DDT spraying.

The nomadic character of many of the inhabitants makes it impossible to protect them from malaria by anti-mosquito measures alone, and therefore anti-plasmodial drugs also play their part in the control of malaria. Drugs are also important for the suppression of epidemics which are apparently started by local outbreaks of exotic mosquitoes such as *A. turkhudi* [*hispaniola*] and not by the usual vector *A. maculipennis* which is responsible for endemic malaria. In the epidemics, the mosquitoes are usually very rare by the time the anti-epidemic mission arrives. *J. R. Busvine*

JASWANT SINGH, RAGHAVAN, N. G. S., NAIR, C. P. & BASU, P. C. **Studies on Weltmann Coagulation Reaction in Simian Malaria.** *Indian J. Malariology.* 1950, June, v. 4, No. 2, 203–8. [11 refs.]

"Weltmann coagulation reaction was performed with the sera of monkeys infected with malaria parasites as well as with those of normal ones. Normal monkeys sera gave rise to a greater percentage of W.C.R. at a concentration of 0·03 to 0·07 per cent calcium chloride whereas infected sera showed a greater percentage of positive reaction with 0·03 to 0·06 per cent. Thus a greater percentage of simian malaria cases gave W.C.R. at a lower concentration but no clear-cut line of demarcation was obtained in the case of normal monkeys corresponding to that found in healthy human beings.

"The disease entities of acute infections in monkeys are not well understood, but indirect evidence shows that greater percentage of acute disease due to exudative and inflammatory conditions give W.C.R. positive at higher concentration (0·1 to 0·08 per cent of calcium chloride solution).

"No correlation between W.C.R. and anaemia has been established."

RIGDON, R. H., MICKS, D. W. & BRESLIN, Dorothy. **Effect of Phenylhydrazine Hydrochloride on *Plasmodium knowlesi* Infection in the Monkey.** *Amer. J. Hyg.* 1950, Nov., v. 52, No. 3, 308–22, 6 figs. & 1 pl. [13 refs.]

It is known that the administration to monkeys of phenylhydrazine hydrochloride brings about specific changes in the erythrocytes, resulting in the formation of Heinz-Ehrlich bodies and methaemoglobin. The authors report the results of experiments carried out with the view to determine whether these changes in the erythrocytes have any effect upon the course of infection of *Macaca mulatta* with *Plasmodium knowlesi*. Preliminary tests with normal monkeys showed that severe anaemia is produced in them with a dose of 150 mgm. phenylhydrazine administered orally several times at intervals of 2–3 days. In the therapeutic experiments, 12 infected monkeys were given various doses of phenylhydrazine. The best results were obtained in 4 monkeys which were given 100–150 mgm. when the parasites first appeared in the blood, followed by two doses of 50 mgm. each, at intervals of 3–5 days. All these monkeys recovered from the acute infection, with a marked decrease of parasitaemia, though the parasites survived in small numbers (less than 1 per 500 red cells) for 2–3 months, without relapses. On the other hand, two groups of 4 monkeys each, which were given lower (40 mgm.) and higher (200 mgm.) initial doses respectively, died. The administration of large prophylactic doses of phenylhydrazine 72 hours before the appearance of the parasites did not affect the subsequent course of the infection.

Phenylhydrazine had a direct effect on all stages of the parasites, producing various degenerative morphological changes in them, causing some of them to escape from the host-cell, and interfering with the synchronicity of their development. These changes are depicted in a plate of figures.

Monkeys successfully treated with phenylhydrazine acquire an immunity to re-infection with *P. knowlesi*, but its duration has not been determined. In some of the treated monkeys, which were subsequently splenectomized, there was no recurrence of the infection, indicating that they were cured by phenylhydrazine, whereas in monkeys splenectomized after quinine treatment there was a recurrence of parasitaemia.

It is suggested "that the primary effect produced by phenylhydrazine on *P. knowlesi* is secondary to its effect on the erythrocyte". Phenylhydrazine appears to be a protoplasmic poison which acts on the parasite directly and indirectly, by producing changes in the red cell, which interfere with the oxygen consumption of the parasite. Finally, many parasites are eliminated by their release from the host-cell and removal from the circulation by phagocytosis.

C. A. Hoare

VINCKE, I. H. & LIPS, M. Note sur la transmission cyclique du *Plasmodium berghei*. [**The Cyclic Transmission of** *Plasmodium berghei*.] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1605–11.

In this interesting paper, the authors describe further work in the Belgian Congo on the transmission of *P. berghei* by sporozoites. [Everywhere else in the world transmission of this infection has been by blood inoculations ; the present paper reveals profound differences in the results obtained after blood and sporozoite infection respectively.] They first report the inexplicable absence of infection in wild *Anopheles dureni* between the years 1947 and 1950 (2,798 negative dissections), though previously in the same area (Kisanga) many infected specimens had been detected. Surveys were extended to other gallery forests, and *Anopheles dureni* infected with *P. berghei* was found at Kudelungu (near Elizabethville), Kasapa and eventually again in the Kisanga

where infected tree-rats had been artificially introduced. The first infected mosquitoes were found in January (1950), the rate rose to as high as 7 per cent. but by May infection had again disappeared (no sporozoites were found in 727 specimens after April 21st).

The infection was transmitted to laboratory animals by inoculating them (intravenously and intraperitoneally) with suspensions of (*a*) infected salivary glands, (*b*) unexamined glands, and (*c*) thoraces. The suspension was prepared either by Whitman's or by Tonkin's method, and inoculation was performed within an hour. White rats, *Thamnomys* sp., *Rattus rattus*, *Tatera* sp. and white mice were used, and a remarkable result was obtained ; the white mice—animals so susceptible to the infection after blood inoculation—either failed to develop the disease or showed a few scanty rings for a short time ; the white rats and the true rat developed ordinary infections after an incubation period of 3 to 8 days. White mice inoculated with stomach contents (*i.e.*, blood) of *A. dureni* showed a fatal infection. [These experiments appear to prove conclusively that *A. dureni* is the natural vector of *P. berghei*. They also show that the pre-erythrocytic cycle is as short as 3 days, and it may therefore be assumed—with a little reserve—that the character of this cycle will be more like avian than mammalian malaria, and probably in mesodermal cells rather than in liver parenchyma. The experiments also appear to demonstrate that the tissues of the white mouse are unsuitable for the initial development of the sporozoite, however adequate its erythrocytes may be for the blood phase later. A corollary to this deduction is that the use of the white mouse for passage of the strain is undesirable, and that the white rat would be a better routine animal—in which, for instance, gametocytes (so prone to disappearance in serial passage in mice) might well last indefinitely.] *P. C. C. Garnham*

DURAND, P. & MATHIS, M. Sensibilité du hamster doré au *Plasmodium berghei* Vincke et Lips 1948. [**Susceptibility of the Golden Hamster to *Plasmodium berghei*.**] *C. R. Soc. Biol.* 1951, Jan., v. 145, Nos. 1/2, 29–31.

Golden hamsters were infected with *Plasmodium berghei* by intraperitoneal inoculation of citrated blood from infected mice ; subsequent passage was effected from hamster to hamster through a series of fourteen. Young animals were used, of an average weight of 78 gm. ; two adult hamsters were also inoculated and responded to infection like the younger. All exhibited parasitaemia by the second or third day, and all succumbed to an intense anaemia. After the fourth passage a heightening of virulence of the strain was reflected in the earlier death of the animals (about a fortnight instead of three weeks). Towards the end of the disease, the hamsters lost much weight (*e.g.*, from 107 gm. to 78 gm.). The behaviour of this parasite in the hamster thus closely resembles the course in the white mouse.

P. C. C. Garnham

REDMOND, W. B., RUNYON, Laliah C. & POLLITZER, W. S. **Erythrocyte Sedimentation Rate in Pigeons infected with *Plasmodium relictum*.** *J. Parasitology.* 1951, Feb., v. 37, No. 1, 48–55, 3 figs. [12 refs.]

The erythrocyte sedimentation rate was determined in white Carneaux pigeons infected with the 1P strain of *Plasmodium relictum*. Rouleaux formation is rare in avian blood, so this factor can therefore be excluded in the interpretation of results. Exchanges were made of varying amounts of plasma or red cells in normal and infected blood respectively, in order to adjust the cell volume. The results clearly show that the sedimentation rate increases *pari passu* with the malaria infection (to a peak of three times the normal) and that the

increase is due to the loss in cell volume (up to 50 per cent.) brought about by the destruction of erythrocytes. By subtracting that quantity of plasma from infected blood necessary to produce a normal cell volume, an approximately normal sedimentation rate was obtained in the artificial sample.

P. C. C. Garnham

BARANGER, P. & FILER, M. K. Action du quinquina sur les formes exo-érythrocytiques de *P. gallinaceum*. [**Action of Quinine on the Exoerythrocytic Forms of** *P. gallinaceum*.] *Acta Tropica*. Basle. 1951, v. 8, No. 1, 52–9. [24 refs.]

The authors showed previously that extracts of cinchona possessed activity against the blood forms of *P. relictum* and *P. gallinaceum* at least equal to that of quinine [this *Bulletin*, 1949, v. 46, 446]. The activity of the latter, of total extracts of the bark and of a red colouring matter, not alkaloidal in nature, also present abundantly in the bark, has been tested in sporozoite-induced infections of *P. gallinaceum*. A combination of alkaloids and calcium, obtained by making alkaline a solution of alkaloidal salts in presence of calcium chloride, was also tested. The method of test was similar to that described by WISELOGLE [this *Bulletin*, 1947, v. 44, 1106] and DAVEY [*ibid.*, 646]. Cockerels in batches of 20 to 30 were inoculated intravenously with a suspension corresponding to ½ mosquito per bird. Death resulted in controls within 10 days after appearance of erythrocytic forms in blood and exo-erythrocytic forms in brain. The drugs were given some days or only a few hours before infection and in the latter case administration was continued twice daily for 6 days. The activity of the substances was assisted by noting the lengthened incubation period and the death rate in experimental animals compared with that in controls. It appeared that results were not correlated with the drug levels in plasma. The action of the different preparations was also tested on the forms present in the gut of the mosquito by feeding the latter on solutions which, however, unlike certain synthetic antimalarials, failed to prevent the formation of oöcysts. The authors concluded that quinine and extracts possessed a definite activity against exo-erythrocytic forms. The extracts were more effective in preventing a fatal issue than quinine. The combinations with calcium and the red colouring matter also possessed activity.

J. D. Fulton

GOODWIN, M. H., Jr. **Observations on the Natural Occurrence of** *Plasmodium floridense*, **a Saurian Malaria Parasite, in** *Sceloporus undulatus undulatus*. *J. National Malaria Soc.* 1951, Mar., v. 10, No. 1, 57–67, 1 fig.

In this ingenious study, a colony of lizards (*Sceloporus undulatus*) was watched weekly for nearly a year to observe the course of enzootic malaria due to *Plasmodium floridense*. The colony had an extremely limited geographical range, often confined to a specific log or tree with movement restricted to a 30-foot radius. The lizards were marked, and blood films obtained, by clipping varying combinations of toes. Half the lizards were examined more than twice. Twelve out of 29 adult lizards showed the infection at some time or other, and 5 out of 27 juveniles. New infections were found in 5 lizards which had previously been free from malaria ; and the infection was first detected late in the season—from September onwards until well into the winter (which was a comparatively warm one). Increase in parasitaemia was also greater during the winter. The incubation period was thought to be about 2 weeks, and parasitaemia was found to persist for as long as 10 months.

P. C. C. Garnham

TRYPANOSOMIASIS

KIRSCH, E. & WESTPHAL, A. Plasmazellen in ihrer Beziehung zu pathologischen Serumeiweissveränderungen bei experimentellen Trypanosomeninfektionen. [**Plasma Cells in their Relation to Pathological Changes in Serum Proteins in Experimental Trypanosomiasis.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Apr., v. 2, No. 4, 497–506. [19 refs.]

The English summary appended to the paper is as follows :—

"Based on histological and serological findings in two cases of visceral leishmaniasis the opinion is advocated that plasma cells should be considered mother cells of coarse-disperse serum proteins. In order to probe such relation experimentally, dogs and rats were infected with Trypanosoma brucei or Trypanosoma gambiense. Serological changes were checked by 7 lability reactions and plasma cell content by histological examination. The supposed interrelation of plasma cells and serum lability could not be confirmed. Since either phenomenon depends on reactions of the vegetative system possibility of an indirect relation is left to dispute. In this respect, the interpretation proffered lately by Brass that proteins included in plasma cells signify a resorptive rather than secretory process deserves attention."

JONCHÈRE, H. Chimioprophylaxie de la trypanosomiase humaine en A.O.F. [**Chemoprophylaxis against Sleeping Sickness in French West Africa.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 83–93.

This paper deals with chemoprophylaxis by pentamidine [=lomidine] in French West Africa. The method was first used in 1946 and the earliest results were described by BRUN-BUISSON *et al.* [this *Bulletin*, 1949, v. 46, 123] and LE ROUZIC [*ibid.*, 1015]. These results were so favourable that it was decided to use the method on a mass scale in an attempt to eradicate remaining foci ["*les derniers foyers*"] of the disease in French West Africa, and progress up to 1948 has already been reported by LE ROUZIC [this *Bulletin*, 1950, v. 47, 451].

By the middle of 1950 the number of people who had received the prophylactic treatment, in a single injection, was 301,633. Most of the work has been done in forest regions of Guinea and Casamance, and only those villages were treated in which the index of new infection was above 1 per cent. The standard dose now used, intramuscularly, is 4 mgm. per kgm. body weight of the base (of which pentamidine is the di-isethionate and lomidine the dimethane sulphonate). Only one death has occurred after the injection, and this was in a congenitally syphilitic child of 30 months, who died of lung oedema 24 hours later.

The author's impression is that the duration of protection is as long as about a year [surely an overestimate]. When infection is detected within this period it is usually recognized clinically as in the second stage without trypanosomes being demonstrable, and is likely to be a case which was already infected but had not been diagnosed at the time of the prophylactic treatment. Apart from benefiting the treated person, this method is also advantageous to the public health by reducing the reservoir of infection. Thus, in one part of the Gueckedou-Kissidougou area of Guinea where five-sevenths of a population of 48,268 were prophylactically treated in 1948, the index of new infection had fallen by the next year from 0·97 to 0·06 per cent. among those treated and to 0·45 among the untreated ; in the population as a whole, therefore, the index fell from 0·97 to 0·16 per cent. *E. M. Lourie*

DIALLO, J. Résultats de la chimioprophylaxie par les diamidines dans le secteur spécial No. 31 à Gueckedou-Kissidougou (Guinée). [**Results of Chemoprophylaxis by Diamidines in a Sector of the Gueckedou-Kissidougou Area of French Guinea.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 93–103.

The area of which this sector forms a part is the one to which reference is made in the last part of the abstract of the communication by JONCHÈRE above. The area is situated in the south-eastern part of French Guinea, jutting into an angle between the Sierra Leone and Liberian frontiers. It is mainly a forest region intersected by many streams, and in places is mountainous, with swampy valleys cultivated from March to June, just when tsetse flies are most active. There are numerous roads and footpaths, and conditions are highly favourable for the maintenance of endemic sleeping sickness and unfavourable for its control by agronomic methods. The topography of the area is described in detail. Its population is between 185,000 and 200,000.

Sleeping sickness was first recognized in this area in 1909 by JANIN, but it had undoubtedly been prevalent long before that time. In 1933, SEGUY found indices of new infection of 15 to 22 per cent. Since then there have been repeated surveys and methodical treatment of cases diagnosed. Prophylactic treatments were started in 1946, and have been greatly extended since then. In 1949 the number thus treated was 87,879, comprising half the population of the sector. The index of new infection was in this way reduced in one year from 1·08 to 0·16 per cent. Only a single injection per person has been given in this campaign, and the author writes that it is certain that if two injections could be given, with an interval of 9 months, it would be possible practically to eliminate the disease from an area. *E. M. Lourie*

COLONIAL OFFICE. **British African Land Utilization Conference, Jos, Nigeria November 7th–15th 1949. Final Report** [EASTWOOD, C. G., Chairman]. 52 pp. 1951. London: H. M. Stationery Office. [2*s*.]

The general purpose of the "Jos Conference" was to consider the present and future utilization of land by Africans. The Chairman, who is a member of the staff of the Colonial Office, was accompanied by several of the advisers of that office, but other scientists from Britain were present. British territories in Africa sent their own technical members, *e.g.*, from the Agricultural and Veterinary Services. The Conference was also attended by administrators, and by observers from other African territories.

Among the resolutions we may quote:

"Put briefly, the ultimate objective must be to ensure that the land of Africa is used to the best advantage. In order to secure this, it is necessary to know what is the nature of the land and what are its potentialities. For this purpose, surveys are required of soils, ecology and hydrology. Just as plans have been laid for systematic topographical and geological surveys in all the British Colonial territories, so plans should be made for the systematic carrying out of these surveys, starting, of course, with the most likely areas for development. Meanwhile, we must proceed to formulate and execute policy in the light of the knowledge which we have at present . . .

"There is much room in all parts of Africa for improvement in peasant husbandry. Such improvement will do much not only to conserve the soil but also to increase production. This is a matter on which Colonial Governments have been very active for many years. We commend to their notice the suggestions made in the Report on Administrative Machinery and Legislation, which we entirely endorse.

"But we feel that over and above this a fundamental change in African peasant agriculture is required if the land is really to be used to the best advantage, if the African is to enjoy an improved standard of living and the educated man is to be attracted to make a career upon the land. More capital must be introduced and more advanced methods of agriculture, such as mechanisation, irrigation and the use of fertilizers, must be employed." The Conference had in view the development of new ways of utilizing land by developing partnerships among peasants, the intention being that a new type of African society might be developed without immediately breaking up the old structure : an excellent if vague objective. Some of these groups might be on their own land, but schemes of settlement on land at present unoccupied should also be worked out. Some of the proposals would entail the use of modern methods [? some mechanization], and this in turn would require an outlay of capital. Importance was attached to recording the cost of schemes in a careful manner. The proposal was considered of developing pilot schemes in several directions, meeting difficulties and new features as they arose.

Much of the work of the Conference was carried out by a number of committees, whose separate reports are presented in the present document. The readers of this *Bulletin* are most directly concerned with the report on trypanosomiasis and tsetse, which discusses the problems that might be met from tsetse when land is developed on a large scale, it being assumed that much of the work would be mechanized, *i.e.*, that domestic animals would not be essential at an early stage. In such a case, it is not likely that *G. morsitans* and similar species would give rise to a serious problem. But the waterside species might require special measures, and special expenditure, for their extermination during the period while this work was being carried out. It would not be a difficult matter to protect the human populations by the use of drugs. The Committee also reported on the problems likely to arise in planning a settlement scheme. Emphasis is laid on the necessity for carrying out tsetse surveys at an early stage ; measures directed against tsetse, such as clearing, should not outstrip the actual settlement of people on the land. The density of the human population which is to be aimed at must depend on a large number of local conditions, including the type of cultivation which is intended. The veterinary problems likely to be met with in the development of pastoral areas were also considered. The committee is cautious both in recommending expenditure on reclamation from tsetse and also on the prophylactic powers of antrycide, "on which such high hopes had been placed". The difficult question of the provision of forest reserves and the relation of these to tsetse flies is noted ; the committee is satisfied in taking an optimistic view of the somewhat indefinite position.

Other committees dealt with administrative and staff questions ; the conservation and use of water resources in a rural community ; and types of agricultural and livestock development suitable in different parts of Africa. The reports give skeleton accounts of the many problems involved.

Misprints are numerous, but not sufficient to cause confusion to the reader.

P. A. Buxton

TORRICO, R. A., & TORRICO, J. R. Caso agudo de enfermedad de Chagas con chagoma de inoculación, diatesis hemorragica, esquizotripanide morbiliforme y sindrome meningo encefalico. [**Acute Case of Chagas's Disease with Inoculation "Chagoma", Haemorrhagic Diathesis, Morbilliform Lesion and Meningo-encephalitic Syndrome.**] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 32–6.

AGOSÍN K., M., CHRISTEN A., R., JARPA G., A. & ATÍAS M., W. Ensayos de quimioterapia en la enfermedad de Chagas experimental. V. Terramicina. [**Chemotherapeutic Trials in Experimental Chagas's Disease. V. Terramycin.**] *Bol. Informaciones Parasitarias Chilenas.* 1951, Jan.–Mar., v. 6, No. 1, 5–6.

The English summary appended to the paper is as follows :—

"The administration of Terramycin in mice inoculated with two Chilian strains of *T. cruzi*, was unsuccessful and all the treated animals developed an infection as severe as the controls. The action of Terramycin in culture of this parasite was equally without effect."

GALLIARD, H. & BOUTET, R. Modifications de l'évolution et de la virulence d'une souche de *Trypanosoma cruzi* Chagas sous l'action de divers produits chimiothérapiques et antibiotiques. [**Effect of Different Agents on the Development and Virulence of** *T. cruzi*.] *Ann. Parasit. Humaine et Comparée.* 1951, v. 26, Nos. 1/2, 5–18, 10 figs. [22 refs.]

The substance which has apparently proved most effective in the treatment of Chagas's disease is that described by IENSCH [this *Bulletin*, 1938, v. 35, 343] and is diallylmalondi (4-amino-2-methyl-quinolyl-6-amide) or 7602Ac. Reports on its activity in animal and human infections have been reviewed [this *Bulletin*, 1943, v. 40, 22 ; 1944, v. 41, 377 ; 1946, v. 43, 633]. Some 8-aminoquinolines were also found effective by GOBLE [*ibid.*, 1949, v. 46, 1131] but proved rather toxic. Antibiotics have so far not been found effective in treatment. The present authors have investigated the action of a number of reputedly effective agents and others chosen at random, on the different stages of development of *T. cruzi* in a series of 200 mice. The strain used was non-lethal to this host. Infection was obtained by the metacyclic forms of the parasite from reduviid bugs through the scarified skin of the animal and by this means a constant type of infection was obtained, with average incubation period of 10 days, the peak of parasitaemia being reached about the 30th day and trypanosome forms were present in blood on average for 55 days. In order to follow the course of the disease counts were made in fresh blood films. The drugs were administered either prophylactically or curatively (after trypanosomes had appeared in the blood). The infectivity of the blood of treated animals for fresh mice was noted as well as the effect of the drugs on incubation period and degree of parasitaemia, all of which are recorded graphically. The conclusions reached were that not even 7602Ac prevented the transformation of metacyclic forms into tissue forms but this substance did cause disappearance of the blood forms of the trypanosome. When given prophylactically and continued for some time both 7602Ac and lomidine (pentamidine) prevented the appearance of blood forms. None of the substances tested was effective against the tissue forms. Penicillin, chloromycetin and streptomycin were completely inactive. It is claimed that nivaquine [sontochin] enhanced the virulence of the infection. The other substances tested appeared to be of little interest. The substances 7602Ac and lomidine were unable to sterilize infected bugs. *J. D. Fulton*

LEISHMANIASIS

CHUNG, Huei-lan & CHANG, Nai-cheng. **A Kala-Azar Complement Fixation Test ; its Diagnostic and Prognostic Value.** *Chinese Med. J.* Peking. 1951, Jan.–Feb., v. 69, Nos. 1/2, 3–18.

This paper reports the results of the complement fixation test in kala azar over two widely separated periods, 1941 [this *Bulletin*, 1942, v 39, 168] and 1948–49.

The antigens were prepared in several ways either from the spleen and livers of infected moles or hamsters, or from human spleens removed surgically. The material was minced and ground, lyophilized and pulverized. Of the dried powder 400 mgm. were dissolved overnight in 10 ml. of normal saline in a refrigerator and the supernatant fluid used as antigen. In a footnote it is stated that lyophilization and freezing are unnecessary and that the material may be dried in a desiccator. The complement fixation test was done by the Kolmer technique. This " consisted of two per cent. sheep cells and antisheep rabbit serum. The unit of the amboceptor was taken as the smallest amount or the highest dilution which produced complete haemolysis. The complement was titrated every time before the tests were set up, using 2 units of amboceptor."

The test was carried out with the serum in :—

(1) 76 cases of untreated kala azar, diagnosed by spleen, liver or sternal puncture : all were positive.

(2) 22 cases of kala azar during the course of treatment ; all were positive throughout but the titre was reduced slightly towards the end.

(3) 21 cases at various periods after complete treatment : 12 sera tested at different periods up to 24 months were all positive : 3 were negative after the 36th month ; and in the intervening period 2 were positive and 4 negative.

(4) 5 cases in which splenectomy was done ; all were positive before and after operation.

(5) 35 cases of kala azar in which the plasma proteins were also estimated : there did not appear to be any linear relationship between the results of the test and the total proteins or the globulin fractions.

(6) 7 early cases of kala azar in which the diagnosis was eventually confirmed by the finding of parasites ; all were positive.

(7) 83 controls which included normal persons, cases of cirrhosis, Banti's syndrome, tuberculosis, syphilis, malaria, typhoid and leukaemia : all were negative.

Summarizing their results the writers state that a positive complement fixation test was obtained in 111 of 112 cases of kala azar and a negative one in all of 83 controls.

[If other workers can obtain similar results, this will be a diagnostic method of very considerable value.] *L. E. Napier*

SEN GUPTA, P. C. **Hydroxystilbamidine in the Treatment of Indian Kala Azar.** *Indian Med. Gaz.* 1950, Dec., v. 85, No. 12, 547–53, 2 figs. on pl.

Hydroxystilbamidine or 4 : 4 diamidino-2-hydroxystilbene di-β-hydroxyethane sulphonate was used by the author in 1948–49 in the treatment of six cases of kala azar [this *Bulletin*, 1949, v. 46, 1134]. He is now reporting the treatment in 42 cases, including the original six.

The patients were Indians [presumably] admitted to a hospital in Calcutta, males and females, of various ages. The diagnosis was made by the finding of parasites in the spleen, sternum, tibia, liver, or ileum [presumably ilium]. Twenty-five had previously had no specific treatment, and 17 were resistant cases.

The drug was given intramuscularly in the majority of cases, in a 10 per cent. solution in 2 per cent. procaine solution, but in a few it was given intravenously dissolved in 25 ml. of 25 per cent. solution of glucose. The maximum single dose given was 1·5 mgm. per lb. of body weight. This was preceded by two smaller doses to test the tolerance of the patient. The drug was given daily, on alternate days, or two doses in three days. A course of treatment consisted of 10 injections in ordinary cases and 15 in resistant cases, and two such courses were usually given with an interval of 10 days between them. The mean total dose given was 2·61 ± 0·81 gm. for ordinary cases and 3·77 ± 1·04 gm. for resistant cases.

There were no serious immediate reactions and the diamido-stilbene neuropathy was not observed, but one patient had troublesome though temporary neuralgic pains.

In one resistant patient treatment altogether failed, but the remainder were discharged as cured. In a follow-up, 34 of 37 patients kept under observation were cured. Three resistant cases had relapsed.

The author considers that the dosage scheme that he followed is a satisfactory one for Indian patients, but thinks that it may have to be modified and the dosage increased for other endemic areas. The results obtained with stilbamidine, urea stibamine and neostibosan are quoted and it is made clear that those of the present series compare very favourably with them.

L. E. Napier

MERCADAL PEYRÍ, J. Primeras experiencias dermatologicas españolas sobre la reaccion de Montenegro. [**Spanish Experiences with the Reaction of Montenegro.**] *Rev. Ibérica de Parasitologia.* 1951, Jan., v. 11, No. 1, 47–59. [18 refs.]

The Montenegro reaction is the reaction given by leishmania patients to a culture of Leishmania grown from material obtained by puncture of a leishmania nodule. The optimum concentration for use is a culture with 3 to 5 million leptomonas per cc. The culture is inoculated intradermally, 0·1–0·2 cc., according to the age of the patient and the thickness and elasticity of the skin, the injections being made in the middle or upper third of the front of the forearm. The result is noted after 48 and 72 hours, the intensity of colour, the formation of a papule and its size, the hardness of infiltration and the presence or not of a vesicle. Erythema and a small superficial papule is designated 1-plus ; a papule or nodule and infiltration to 0·5 cm. is 2-plus ; deep infiltration and more extensive erythema 3-plus.

A list of 38 patients is given, stating the age, sex, duration of disease, the clinical form and nature of the lesions and the duration of the reaction. The ages ranged between 10 months and 61 years, 24 were females, 14 were males ; 15 gave 1-plus, 17, 2-plus, 4, 3-plus, one a +—, and one a —.

Strange as it may seem, the intensity of the reaction was not conformative either to time of evolution of the lesions or to the clinical form of the disease ; one with a small papule of a few months' duration might give a 3-plus, whereas another, with extensive and long-standing lesions might give a weaker reaction. Cured cases, whether recently or more than 3 years previously, gave a frank positive. The only negative reactor was boy of 12 years with a lupoid lesion of 4 years' evolution.

The reaction was tested on 12 patients with tuberculous lupus ; 2 proved positive (others have recorded 8 cases all negative and 12 cases all positive). In tuberculoid leprosy the test was tried in a few cases only ; all were negative, and of 10 healthy subjects again all were negative.

The author concludes that in the Mediterranean type of cutaneous leishmaniasis the test, with an antigen prepared from *L. brasiliensis*, is of high diagnostic value, being positive in 37 out of 38 cases [called 97 per cent.] and that "the positive result given by a few patients suffering from lupus does not detract from its value". *H. Harold Scott*

MÉCHIN, R. & SI HASSEN, A. Onze nouveaux cas de bouton d'Orient du Tell Constantinois. Traitement par la pénicilline. [**Eleven New Cases of Oriental Sore in the Constantine Region. Trial of Penicillin.**] *Arch. Inst. Pasteur d'Algérie,* 1949, Dec., v. 27, No. 4, 312–14.

Eleven new cases of oriental sore acquired in the Constantine region of Algeria are reported. In most of these treatment by quinacrine [mepacrine] infiltrations caused healing in a relatively short time.

In two cases, one of which is included in the above eleven and another in which the patient acquired the infection in Biskra, penicillin was used ; it was given in small doses locally in one case and in large doses both locally and generally in the other. In neither case was a complete cure effected, although some temporary local improvement occurred in both. *L. E. Napier*

FEVERS OF THE TYPHUS GROUP

WOYCIECHOWSKA, S. O barwieniu rickettsji. [**The Staining of Rickettsiae.**] *Przeglad Epidemiol.* Warsaw. 1949, v. 3, Nos. 3/4, 359–72. [24 refs.] French summary.

An investigation has been made of the factors involved in Weigl's method of staining rickettsiae. Louse guts infected with *R. prowazeki* were fixed in formol and 4 per cent. potassium bichromate in the proportion of 1 : 3. The brand of formol used seemed to be of importance, and the best results were obtained with the Merck brand. The stain was made by dissolving 3·8 gm. of Giemsa's stain in 250 gm. of glycerol heated to 60°C. ; 250 gm. of methyl alcohol were then added. The stain was diluted in the proportion of 4 drops to 1 cc. of water and applied for 1 to 2 hours. An investigation was made of the effect of various substances on the staining. The most intense coloration was obtained when potassium carbonate was added in the concentration of 0·2 per cent. at *p*H of 7·2 to 7·4 ; rickettsiae stained violet, red cells pink and protoplasm blue. Rickettsiae in lungs and other organs of mice, rats and rabbits stained equally well. Attempts to fix the stain in the rickettsiae with mordants were unsuccessful. A rapid method is also described, which can be carried out in two hours ; the material is fixed for 10 minutes and kept for 5 minutes in stain heated to steaming point. *D. J. Bauer*

KRYŃSKÍ, S. & WOYCIECHOWSKA, S. Badania nad dzialaniem błękitu metylenowego na *Rick. prowazeki.* [**Action of Methylene Blue upon** *R. prowazeki.*] *Przeglad Epidemiol.* Warsaw. 1949, v. 3, Nos. 3/4, 386–94. English summary.

Traces of methylene blue in a suspension of *Rickettsia prowazeki* will prolong the course of infection when the suspension is inoculated into lice. This action has been investigated in detail by observing the effect of methylene blue upon both the toxicity and the infectivity of a rickettsial suspension. For the toxicity experiments a concentrated suspension of louse guts infected with *R. prowazeki* was used, which contained 20 guts emulsified in 0·5 cc. of saline.

Methylene blue was added in a concentration of 0·01 per cent. and the suspension was kept in the light for 15 to 30 minutes at 20°C. Lice were then inoculated with the suspension and were examined for evidence of toxicity over a period of 24 hours. The toxicity of the rickettsiae was found to be greatly reduced by treatment with methylene blue. A similar reduction was also found in infectivity in experiments with a more dilute suspension of rickettsiae. The anti-rickettsial action of methylene blue was generally proportional to its concentration, but in some instances a greater effect was observed with lower concentrations ; the action was rapid and was effective within the first few minutes of contact. Lice were not protected when they were injected with methylene blue 2 hours after or 24 hours before infection with rickettsiae. In similar experiments it was found that *Rickettsia pediculi* was not affected by methylene blue. *D. J. Bauer*

KRYŃSKI, S. Zasady przygotowania zawiesin do sztucznego zakażania wszy met Weigla. [**Principles of Preparation of Rickettsial Suspensions for Louse Inoculation (Weigl's Method).**] *Przeglad Epidemiol.* Warsaw. 1949, v. 3, Nos. 3/4, 333–42, 4 figs.

[Typhus vaccine is made in Poland by Weigl's method of louse inoculation, and in this and the following papers a description is given of the technique which is in use at the present time.]

The principles which are involved in the preparation of suspensions of louse gut containing *Rickettsia prowazeki* are discussed. One gut suspended in saline provides enough material for infecting 500 lice ; polyvalent vaccines may be made by blending suspensions of guts infected with different strains of *Rickettsia.* Strains are maintained by passage with suspensions of a single gut, whereas pooled suspensions of a considerable number of guts are used for inoculating lice in the mass production of vaccine. Lice used for the seed material must be free from bacteria and other rickettsiae, but contaminated lice may be used if necessary after they have been washed with 60 per cent. ethyl alcohol or 0·5 per cent. phenol and then with saline. Other rickettsiae such as *R. pediculi* are eliminated from the seed by passage at high dilution, but a new colony of lice may have to be established in order to eliminate contamination with *R. rocha-limae.* The lice must be living or recently dead ; a stained film of the suspension is examined and the seed material is suitably diluted according to its content of rickettsiae. The titre of the suspension must not be too high or the lice will die within 24 or 48 hours from a toxic effect. The best yield is usually obtained if lice are inoculated with a suspension of 1 to 4 guts in 1·0 cc. saline. The suspension must be kept in the dark, and should not be stored for longer than 8 hours at 4°C. *D. J. Bauer*

RADKOWIAK, J. D. Technika zakażania wszy metodą Weigla. [**Weigl's Technique of Louse Inoculation.**] *Przeglad Epidemiol.* Warsaw. 1949, v. 3, Nos. 3/4, 343–58, 11 figs.

A semi-automatic method is used for the anal inoculation of lice with rickettsial suspension. The material is placed in a special capillary tube which is connected to a compressed air reservoir through a reducing valve and a magnetically operated tap controlled by a foot switch. When the latter is operated air pressure is communicated to the capillary and a drop of suspension is ejected. The construction of the apparatus is shown in drawings, and the technique of making the micropipettes which are used for the inoculation is described. Sterile 12-day-old lice are fed and then kept at 34°C. or 29°C. for 24 hours ; they are fixed in sterile clamps in groups of up to 30 which are then

put in the inoculation apparatus. The handling of the lice is facilitated by placing a light opposite ; negative phototaxis then makes the lice move towards the operator. The louse to be inoculated is observed under a binocular microscope with a magnification of 32 diameters ; the pipette is inserted into the rectum as far as the ampulla and the suspension is injected by depressing the foot switch. The process is then repeated, and from 1,200 to 1,500 lice can be inoculated in one hour. *D. J. Bauer*

WOJCIECHOWSKI, E. Spostrzeżenia nad odczynami serologicznymi w durze plamistym występującym sporadycznie. [**Observations on Serological Reactions in Sporadically Occurring Cases of Typhus Fever.**] *Przeglad Epidemiol.* Warsaw. 1949, v. 3, Nos. 3/4, 373–85. [29 refs.] English summary.

Serological tests for the diagnosis of typhus were carried out on 540 serum specimens taken from 467 suspected cases of febrile illness which occurred in the Warsaw area between 1947 and 1950. The diagnosis of typhus was established in 140 patients, 58 of whom were inhabitants of Warsaw ; the disease occurred sporadically except for a small epidemic of 15 cases. The Weil-Felix reaction was positive to a titre of 1/200 or higher in 83 patients (59·28 per cent.), and to a titre of 1/100 in 13 (9·28 per cent.) ; a titre of 1/100 is not considered to be of diagnostic significance and the reaction was thus negative in 40·72 per cent. of cases. Among the 323 other patients who were suffering from febrile illnesses other than typhus, a positive result of 1/200 or higher was found in 21 (6·5 per cent.), 15 of whom were suffering from typhoid and 2 from paratyphoid B. Some of these persons may, of course, have developed antibodies from vaccination or a previous attack of the disease.

The rickettsia agglutination test was positive (a titre of 1/100 or higher) in 137 cases (97·85 per cent.). A titre of 1/100 to 1/200 was usually found on the 7th day of illness, 1/400 to 1/1,600 between the 8th and 10 days, 1/200 to 1/3,200 between the 11th and 15th days, and 1/200 to 1/1,600 between the 16th and 25th days after the onset of illness. The reaction was positive in 12 of the 323 cases of other febrile illnesses (3·71 per cent.) ; 6 of these were cases of typhoid and 2 of paratyphoid B. The Weil-Felix reaction was also positive in all except one of these cases.

The complement-fixation test was carried out on 142 specimens of serum, 28 of which were from cases of typhus. The latter all gave positive results with both soluble and rickettsial antigens. A comparison is given of the titres obtained by this and the preceding method at various stages in the disease, in which it is seen that the results of the two methods are in general agreement. The complement-fixation test was negative in 98 (85·96 per cent.) of 114 patients suffering from other febrile illnesses.

In summary, it is concluded that the Weil-Felix test is not reliable as a diagnostic method in view of the fact that it gave 40 per cent. of negative results in undoubted cases of typhus. *D. J. Bauer*

KASS, E. H., NEVA, F. A. & FINLAND, M. **Failure of ACTH to protect against Acutely Lethal Toxins of Influenza Virus and Rickettsiae.** *Proc. Soc. Exper. Biol. & Med.* 1951, Mar., v. 76, No. 3, 560–63. [19 refs.] [Summary appears also in *Bulletin of Hygiene.*]

" ACTH did not reduce the acute toxic effect of influenza virus in mice or rats nor the similar action of the rickettsiae of murine and epidemic typhus in mice."

RICKARD, E. R. **Murine Typhus Complement-fixing Antibodies in Human Sera from Western Peninsular Florida.** *Amer. J. Hyg.* 1951, Mar., v. 53, No. 2, 202–6, 1 fig. [10 refs.]

In an area in the west of the Florida Peninsula in which murine typhus is known to be endemic, 3,678 sera submitted for premarital tests for syphilis were tested for complement-fixing murine antibodies. At titres of 1–8 or over, 3·6 per cent. were positive.

Sera of 50 persons known to have been positive about 32 months previously were again tested and little change was found to have occurred ; 2 sera positive at a titre of 1–4 had become negative at 1–2. It was also found that the percentage of positives among the 3,678 sera was 1·6 per cent. in persons aged 40 years or over and 4·6 per cent. in the 20–29 age-group ; this suggested a possible loss of antibodies with the lapse of time. *John W. D. Megaw*

RICKARD, E. R. **Postinfection Murine Typhus Antibodies in the Sera of Rodents.** *Amer. J. Hyg.* 1951, Mar., v. 53, No. 2, 207–16.

Among 635 *Rattus rattus* only 13 failed to react at titres of 1–8 or over to complement-fixation tests after intraperitoneal inoculation with murine typhus rickettsiae, and among 238 cotton rats (*Sigmodon hispidus*) only 4 remained negative. In *R. rattus* the titre rose more rapidly after large than after small doses ; between 7 and 14 days the average was 1–740 after large doses and 1–128 after small ; later there was no significant difference, the average titres being 1–840 and 1–800 respectively between the 15th and 30th days. Between two and three months the titre began to decline and between 6 and 12 months the averages fell to about 1–200.

In the cotton rat an average titre of 1–1,920 was reached between 7 and 14 days. All the above averages are stated in terms of the geometric mean titres.

Among *Rattus* rats selected because of giving high complement-fixation titres none reacted with the rickettsia-agglutination test before the 21st day ; 76·4 per cent. reacted with the test at titres of 1–20 or over between 2 and 3 months. This was the highest percentage reached ; between the 9th and the 12th month it had fallen to 4·8. Among cotton rats the rickettsia-agglutination reaction became positive in 90 per cent. of the animals in similar conditions in the 7–14-day period.

A comparative test of the rickettsia-agglutination and Weil-Felix reaction was made ; among 72 rats which reacted strongly with the complement-fixation test 58·3 per cent. were positive with the rickettsia test and only 9·7 per cent. with the Weil-Felix test in which the titres reached by the 7 rats which reacted were 1–20 or 1–40.

The complement-fixation test was, therefore, regarded as the most accurate for detecting past infection among rats and the Weil-Felix as the least accurate.

Another conclusion reached was that among wild *Rattus* rats a complement-fixation titre of 1–8 can be regarded as significant, but among cotton rats titres of 1–64 or below are of doubtful significance. *John W. D. Megaw*

WERTMAN, K. & SARANDRIA, J. L. **Complement-Fixing Murine Typhus Antibodies in Vitamin Deficiency States.** *Proc. Soc. Exper. Biol. & Med.* 1951, Feb., v. 76, No. 2, 388–90.

Five rats were kept for six weeks on a diet containing one-tenth of the optimum amount of vitamin E complex and a control group of five rats were

given the optimum amount of the vitamins. All the rats were given a course of four intraperitoneal injections of 1·0 cc. of murine typhus vaccine at weekly intervals. Complement-fixation tests carried out one, two, and three weeks after the last injection showed that the antibodies were as plentiful among the rats on the deficient diet as among the controls.

In another experiment tests on similar lines were carried out on groups of rats fed on deficient diets but the complement-fixation tests were carried out one week after each of three successive doses of the vaccine. One week after the third dose the average height of the titres of each group of eight rats and of a control group of five rats was as follows : the range of the titres in each case is shown in brackets : (*a*) controls 1,929 (1,280 to 2,560) ; (*b*) total deficiency in vitamin E complex 580 (320 to 1,280) ; (*c*) absence of pantothenic acid 1,280 (320 to 2,560) ; and (*d*) absence of thiamin 290 (160 to 640).

The authors, rightly, do not state any dogmatic conclusion.

John W. D. Megaw

DURAND, P. Dix ans de lutte contre le typhus en Tunisie. [**Ten Years of Typhus Control in Tunisia.**] *Congrès Internat. Hyg. et Méd. Méditerranéennes Alger, 3, 4, 5 Avril 1950.* 202–11. [See this *Bulletin*, 1951, v. 48, 538.]

GIROUD, P. & JADIN, J. Présence des anticorps vis-à-vis de *Rickettsia orientalis* chez les indigènes et les asiatiques vivant au Ruanda-Urundi (Congo Belge). [**Antibodies to *Rickettsia orientalis* in Africans and Asians living in Ruanda-Urundi, Belgian Congo.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 50–51.

Intradermal reactions undertaken hitherto by the authors with *Rickettsia orientalis* antigen have given negative results up to the present among Africans in the Middle Congo and in Oubangui.

They therefore examined residents of the neighbouring territory of Ruanda-Urundi, where there has been immigration for a long time by Arabs from the Gulf of Aden and by Indians born either in India or of parents resident in East Africa.

Tests on 16 Africans with the principal rickettsial antigens produced 1 positive reaction with *Rickettsia prowazeki* antigen, 12 with *R. mooseri*, 13 with *R. conori*, 10 with *R. burneti* and 2 with *R. orientalis* antigen. In the last two cases complement fixation was positive at titres of 1/80 and 1/320 respectively.

As the Africans in the area where these results were obtained are in contact with Arabs and Indians working there the authors carried out similar tests with the latter people.

In 9 adult Arabs, 3 gave clear positive intradermal reactions with *R. orientalis* antigen, 3 reactions were weak and 3 were negative. Complement fixation tests in 8 of these Arabs resulted in 4 positive reactions, three at titres of 1/1,280 and one at 1/640.

Five positive intradermal tests with *R. orientalis* antigen were obtained among 7 Indians : two of them were adults born in Africa who had never left that continent. Complement fixation tests in 4 of the Indians were positive in two cases with *R. orientalis* antigen at a titre of 1/160.

The authors note that antibodies to *R. orientalis* were thus present alike in the indigenous people of Ruanda-Urundi, in Asian-born subjects long resident in Africa and in Indians born in East Africa who had always lived there.

H. J. O'D. Burke-Gaffney

DE MAGALHÃES, O., CAFÉ, B. & ROCHA, A. Ensaios de terapêutica no tifo exantemático neotrópico no Brasil. (Terramicina e aureomicina). (Nota prévia). [**Treatment of Neotropical Exanthematic Typhus of Brazil by Terramycin and Aureomycin.**] *Brasil-Medico.* 1950, Dec. 16 & 30, v. 64, Nos. 50/52, 311.

Eleven patients suffering from neotropical typhus were treated, 8 with terramycin and 3 with aureomycin. In the affected locality 13 cases had occurred during the previous year and all of them ended fatally.

In the group now described there was only one death, which occurred within 7 hours of admission when the patient was already moribund.

The usual total dosage was 12 to 25 gm. The temperature fell within 48 to 60 hours. Doses of 0·25 to 0·5 gm. were given hourly for 12 to 16 hours and then every 4 hours till the fall of the temperature.

The authors state that there is now an effective treatment for this grave disease and that workers on the causative agent can work in future with easier minds. *John W. D. Megaw*

SLEISENGER, M. H., MURRAY, E. S. & COHEN, S. **Rickettsialpox Case due to Laboratory Infection.** *Pub. Health Rep.* Wash. 1951, Mar. 9, v. 66, No. 10, 311–16, 1 chart.

The authors describe a case of rickettsialpox which occurred in a technician who had manipulated yolk-sac cultures of *Rickettsia akari* on November 16–22, and was attacked on December 3.

The attack was of the usual type except for the absence of the primary lesion which occurs in 90 to 95 per cent. of natural infections ; the manner of infection was probably responsible for the absence of this usual feature. The complement-fixation titre rose from zero on the 7th day to 1–80 on the 12th day and remained at the same level till the 68th day. The reaction with the antigen of Rocky Mountain spotted fever was the same as that with the antigen of rickettsialpox. *John W. D. Megaw*

DECOURT, J., GIROUD, P. & GOULON, M. Premier cas de " fièvre Q " (maladie de Derrick-Burnet) contractée dans le département de la Seine. [**The First Case of Q Fever (Derrick-Burnet Disease) contracted in the Seine Department of France.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1951, Nos. 7/8, 270–76, 1 fig. [14 refs.]

The authors give a graphic description of a severe attack of the pneumonic type of Q fever. They state that it appears to them to have been the first to be " contracted " in the Seine Department. It would have been more correct to say that it was the first to be detected.

The patient was an animal attendant in a large commercial laboratory where he looked after a large number of experimental animals including dogs, foxes, rabbits, guineapigs and white rats. He had frequently been bitten and scratched by the animals and had often found ticks on his clothing, but he did not remember having been bitten by them. There was no known contact with cattle, sheep, goats or horses except for handling the flesh on which the dogs were fed.

The attack was exceptionally severe. About the third day he was seen by a doctor who gave him a million units of penicillin, but without effect, and two days later he was admitted to hospital where about the 9th day the temperature fell by lysis but low fever and headache persisted. About the 20th day 3·0 gm. aureomycin was given in divided doses but the patient could not tolerate the

drug and terramycin was given instead ; the initial dose was 3·0 gm. ; this was followed by doses of 0·5 gm. four times a day and a rapid improvement followed.

On the 22nd day the complement-fixation titre was 1–20 ; on the 40th day it had risen to 1–320.

There was no clear evidence of the source of the infection.

John W. D. Megaw

CHANG, Nai-ch'u, ZIA, S. H., LIU, Feng-ting & CHAO, Shu-hsuan. **The Possible Existence of Q Fever in Peking with a Brief Review on its Current Knowledge.** *Chinese Med. J.* Peking. 1951, Jan.–Feb., v. 69, Nos. 1/2, 35–45, 1 fig. [64 refs.]

In a case of primary atypical pneumonia in Peking the complement-fixation titre with *Rickettsia burneti* rose to 1–64 on the 22nd day ; the reaction was completely negative on the 11th day.

There was no history of contact with cattle, sheep or infected persons.

Among 37 patients with atypical pneumonia 7 reacted at titres of 1–8 to 1–64 with *R. burneti* antigen ; none of 15 normal persons reacted.

John W. D. Megaw

CALERO M., C. Fiebre Q en Panama. Reseña de un caso. [**A Case of Q Fever in Panama.**] *Archivos Hospital Santo Tomas.* 1949, July–Dec., v. 4, Nos. 3/4, 69–82, 1 chart & 4 figs. [22 refs.]

The English summary appended to the paper is as follows :—

" Another case of Q fever is reported from a laboratory employee, where studies of *R. burneti* were being carried out.

" The diagnosis is briefly discussed and it is compared with the clinical types reported in patients infected in a similar way. The possible methods of infection are compared."

LAUR, A. & RABENSCHLAG, K. Über Pneumonien bei Q-Fieber. (Ein Röntgenbeitrag.) [**The Radiological Features of Q Fever Pneumonia.**] *Deut. med. Woch.* 1951, Apr. 6, v. 76, No. 14, 443–5, 6 figs. on pl. [19 refs.]

Infiltration of the lungs was found by X-ray examination in 51 (20 per cent.) of 250 patients suffering from Q fever. Among 27 of the patients in whom infiltration was found the physical signs were negative in 17 and pronounced in only 4.

In clinically severe attacks the infiltration tended to be large or multiple ; in mild attacks it tended to be small or single.

It was single in 35 and multiple in 16. Infiltration of the hilum was definite in 30, doubtful in 6, and absent in 15. The condition appeared early in the course of the fever and often persisted when convalescence was fully established.

The references to the findings of other observers add considerably to the value of the paper.

John W. D. Megaw

BARTONELLOSIS

HAVLIK, O. **The Influence of Penicillin and Streptomycin on Experimental Bartonellosis of Rats.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1950, v. 3, Nos. 1/2, 57–8.

The author gives details of experiments in which white rats infected with *Bartonella muris* received various schedules of penicillin and of streptomycin. No appreciable effect was observed in any case.

H. J. O'D. Burke-Gaffney

LASKOWSKI, L., STANTON, Mearl F. & PINKERTON, H. **Chemotherapeutic Effectiveness of Alloxan in Murine Bartonellosis.** *Proc. Soc. Exper. Biol. & Med.* 1951, Mar., v. 76, No. 3, 475–7.

"Alloxan in relatively low and presumably nondiabetogenic dosages was found to be effective in preventing the development of murine bartonellosis, which invariably follows splenectomy in untreated carrier rats. The activity of this agent probably depends on its reaction with SH groups."

YELLOW FEVER

HERRERA, J. M., ELTON, N. W. & NICOSIA, J. La aparicion en Panama de un brote de fiebre amarilla en su forma "Selvatica" (1948–1949) descubierto por el examen postmortem. [**Appearance of an Outbreak of Jungle Yellow Fever in Panama (1948–49) discovered at Autopsy.**] *Archivos Hospital Santo Tomas.* 1949, July–Dec., v. 4, Nos. 3/4, 1–49, 20 figs. [27 refs.]

Forty-three years after Gorgas had, according to general belief, eradicated yellow fever from Panama, the cases here recorded came as a bolt from the blue. Towards the middle of November, 1948, a man of 25 years, who had gone with a hunting party riding in the woods of Pacora, in the Province of Panama, came to hospital complaining of shivering, vomiting, diarrhoea and abdominal pain. He became delirious, had fever to 37·2°C. and two days later he died, his temperature having risen to 40·2° and his pulse 80–100 per minute. Although no parasites were seen in his blood, the diagnosis of "malarial encephalitis" was made. Histological examination of tissues at autopsy revealed considerable changes in the liver, but not those typically characteristic of yellow fever.

The day after he first came to hospital, a man of 42 years presented himself with bronchial signs and an enlarged liver, with albuminuria. He became jaundiced and died two days later. Eleven days after this, a third patient, a man of 35 years, came to hospital with a slightly enlarged and painful liver and a history of three days' headache, chills and diarrhoea. Death occurred here also in two days, with jaundice. Within a week a man of 24 years came to hospital and died in two days. He had been working at rice cultivation at the edge of Utive wood, near Pacora, the week before, and he had been bitten by mosquitoes which were swarming when trees were felled. His symptoms for five days before admission were the same as in the others, headache, chills and vomiting; on admission his temperature was 40°C. A few weeks later, a fifth case occurred in a youth of 16. In the cases after the first the changes typical of yellow fever were seen on microscopical examination of the liver and the kidney changes were also characteristic.

No more such cases were seen during the ensuing 8 months, but in August two more patients, 22 and 20 years of age, who had been working in the same area as the former patients, came to hospital with similar complaints and they also died in two days and their livers showed the typical yellow fever pathological changes and bloody fluid in the bowel.

Incidentally, sera were taken from ten persons to test their immunity reactions. Five were positive and they gave a history indicative of mild yellow fever ; three were negative. The other two were positive and gave a history of symptoms of hepatitis, but they had been vaccinated against yellow fever 15 days previously.

The article is illustrated by excellent reproductions of the tissue changes in the liver and kidney. *H. Harold Scott*

DENGUE AND ALLIED FEVERS

FAURE, R. M. Fièvre et phlébotomes. Essai clinique sur la possibilité de la présence de la fièvre à phlébotomes en Afrique du Nord. [**The Possible Occurrence of Sandfly Fever in North Africa.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 77–83.

Between May 23 and June 7, 1946, the author saw 16 cases of a short fever at the Preparatory Military School of North Africa, situated about 100 miles west of Algiers. The fever lasted three or four days in 12 of the cases and six to seven days in the other four. The fever curve showed a single spell of fever in 10 cases ; a secondary rise of temperature, before the first spell had come to an end, occurred in 3 cases, and there were two separate spells of fever in 3 cases.

A diagnosis of dengue was open to the objections that there was no rash in any case, the pains were not localized in the joints, and no *Aëdes* mosquitoes could be found. There were numerous sandflies ; 78 specimens of *Phlebotomus perniciosus* were identified, but although these and 10 other sandflies belonging to three different species of *Phlebotomus* have not been recognized as vectors of " three days fever " the author feels justified in believing that the disease was phlebotomus fever, especially as numerous cases of the same kind were occurring in the neighbourhood at the same time. *John W. D. Megaw*

PLAGUE

MEUNIER, R. Protection sanitaire aux frontières de l'Algérie. [**Sanitary Control Measures on the Frontier of Algeria.**] *Congrès Internat. Hyg. et Méd. Méditerranéennes Alger, 3, 4, 5 Avril 1950.* 161–71, 16 figs.

The most important part of this interesting paper is a description of the " sanitary control of rats " which consists in the systematic capture of living rats for the detection of the occurrence of plague infection among them. The author states that in the conditions existing in Algeria attempts to eliminate rats are useless ; some observers go so far as to suggest that the only result will be to create better environmental conditions for the rats except in limited spaces such as ships. One expert goes so far as to recommend the use of gases in insecticidal doses rather than as raticides [presumably with a view to providing any stray infected fleas with their preferred sources of food supply and so make it unnecessary for them to seek a human victim. DDT dust would have the same hypothetical advantages].

The general scheme of sanitary control of rats in operation since 1936 consists of (1) the establishment of plague laboratories : (2) an organization for trapping rats : (3) systematic study of the rats and their fleas : (4) improvements in the methods of examining rats : (5) training special staffs of workers and (6) investigation of rat poisons.

Among 197,462 rats examined 85·6 per cent. were caught in towns, 12 per cent. in the dock areas and 2·4 per cent. in ships. In the docks 30 per cent. of the rodents were *Rattus rattus* and 53 per cent. were *R. norvegicus*. In the towns 10 per cent. were *R. rattus* and most of the rest were *R. norvegicus*. In the ships 95 per cent. were *R. rattus* and only 0·7 per cent. were *R. norvegicus*.

Rats found infected in recent times in Algiers were 10 *R. rattus* and 3 *norvegicus* in 1944 ; and in the docks 8 *R. rattus* and 2 *norvegicus* in 1940. In proportion to the numbers caught *R. rattus* was infected 8 to 9 times more frequently than *R. norvegicus*.

The predominant rat-flea in Algiers was *Xenopsylla cheopis* ; on the average 73·6 per cent. were of this species ; in summer the percentage rose to 97, in winter it fell to 23.

Squill (*Urginea maritima*) was found to have remarkable properties as a rat poison ; it is effective in doses of a few (*quelques*) centigrammes and is non-toxic to man. Its exportation from Algiers is not permitted unless it reaches a fixed standard of potency which has been determined by a thousand tests.

John W. D. Megaw

CHOLERA

MEHTA, R. D. **Cholera in Hyderabad State.** *Indian Med. Gaz.* 1950, Dec., v. 85, No. 12, 569–72, 2 maps, 1 chart & 1 graph.

A statistical analysis was undertaken of the trend of cholera mortality in Hyderabad State, and of the seasonal incidence of the disease in each district, during the period of 45 years from 1904 to 1948. A steady upward trend has been shown, the increase in incidence being in all districts except Warangel.

"It is not unlikely that the trend may in some measure be due to an improvement in the recording of cholera mortality statistics. If, however there has not been any material improvement in the registration of vital statistics the one conclusion to be drawn from the chart is that cholera problem has so far failed to receive due attention."

The highest incidence and greatest rate of increase have been in the north-west districts of the state which are largely inhabited by Maharastrians.

It is believed that there are two main routes of spread into the state, one through Shrisailam in Kurnool District and the other through Pandharpur in Sholapur District, pilgrims returning from fairs at these centres bringing in the infection. The Shrisailam fair is held in March and the subsequent introduction of infection causes an outbreak in the adjoining districts which runs a mild course in March and April, with higher incidence from May onwards.

The Pandharpur fair occurs later, in July, and is followed by a high incidence in the north-west Maharastra districts during July to September. The month of maximum incidence is August.

"The recorded statistics indicate that the incidence of the disease has remained uncontrolled."

J. Taylor

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

MORTON, T. C., NEAL, R. A. & SAGE, Minnie. **Indigenous Amoebiasis in Britain.** *Lancet.* 1951, Apr. 7, 766–9, 3 figs. [11 refs.]

In 1947–48 three consecutive daily specimens of stools from 1,000 young (17–18 years) air apprentices, who had not been out of Great Britain, were examined for protozoa. Sixteen of the boys were found to harbour *Entamoeba histolytica* infections, 7 of them belonging to large cyst-producing (over 10 microns) and 8 to small cyst-producing races of parasite. None of the infected boys suffered from symptoms referable to the infection. Emulsions of the infected stools on being given orally to young rats caused infection in 5 cases ; in 3 of these there were ulcerative lesions. Cultures of amoebae obtained from two boys produced infections, with ulceration, on intracaecal inoculation in rats ; one of these two had failed to produce infection on feeding. In no case was rat infection obtained with a small cyst-producing strain of parasite.

Three cases of amoebic dysentery, one of them fatal, are recorded in adult R.A.F. personnel who had not been out of Great Britain. [For a discussion on amoebiasis in Britain, see this *Bulletin*, 1950, v. 47, 1083 : for reference to indigenous cases see also this *Bulletin*, 1949, v. 46, 936.] *A. R. D. Adams*

SPINGARN, C. L. & EDELMAN, M. H. **The Effect of Aureomycin Hydrochloride on the Growth of** *Endamoeba histolytica in vitro.* *Amer. J. Trop. Med.* 1951, Mar., v. 31, No. 2, 206–11. [15 refs.]

The purpose of this investigation was to study the effect of aureomycin on the growth of *E. histolytica* and associated bacteria in culture. The strain used was obtained from a patient who was subsequently treated with the drug and remained free from infection over a period of 5 months. In the diphasic medium used, to which rice flour was added, *E. histolytica* was accompanied by two added species of anaerobic bacilli, both equally sensitive to aureomycin. In one series of experiments the effect of the drug in serial dilutions, which had been added at the same time as the inoculum, was observed daily as regards growth of amoebae and bacteria over a period of 14 days. Depending on the concentration of the antibiotic present, amoebic growth was either completely inhibited or there was a lag phase in growth proportional in length to this concentration, associated with a temporary inhibition of bacterial growth. In every case there was recovery of bacterial growth which preceded that of amoebae. In a second series of tests, fresh subcultures of amoebae were treated with aureomycin at different concentrations and after one hour the tubes were centrifuged and the sediment washed with serum-saline before being added to fresh medium. The process of centrifuging and washing was repeated. The sediment was then inoculated to tubes of fresh medium in half of which the two added species of bacteria had grown for 24 hours. Observation on these tubes and on untreated controls was continued as before for 14 days. By this means uniform inhibition of bacteria resulted. The results indicated that amoebic growth always occurred in presence of that of the added bacilli and the lag phase was reduced, likewise when growth of the bacteria originally present was unaffected by aureomycin. The degree of inhibition in amoebic growth increased with concentration of the drug. It was concluded that aureomycin acted directly on the amoebae as well as indirectly through its effect on bacteria.

J. D. Fulton

SHAFFER, J. G. & BIEGELEISEN, J. Z. **The *in vitro* Effect of Aureomycin and Chloromycetin on Cultures of *Endamoeba histolytica* and *Trichomonas hominis*. I. The Ability of the Antibiotics to prevent Growth and Multiplication of the Organisms.** *Amer. J. Hyg.* 1951, Mar., v. 53, No. 2, 139–45.

The successful use of aureomycin in amoebiasis has been described by McVAY *et al.* [this *Bulletin*, 1949, v. 46, 1044 ; 1950, v. 47, 746]. The present investigation has been designed to find the effect of this substance and of chloromycetin on *E. histolytica* by *in vitro* methods, since a medium was available for culture of this organism in absence of demonstrable growth, of a Gram-negative anaerobic streptobacillus present [SHAFFER *et al.*, *ibid.*, 1948, v. 45, 1001 ; 1949, v. 46, 634]. Studies of a similar nature were made concurrently with *Trichomonas hominis* maintained in the same medium.

Three different strains of *E. histolytica* which had been frequently subcultured in the above medium and one of *T. hominis* were used. The drugs were dissolved in sterile saline and made up to the required concentrations by serial dilution. The inoculum of *E. histolytica* was obtained from 48-hour cultures and the number of amoebae added to each experimental tube was kept as constant as possible. Observation on the number of surviving amoebae was made after 48 hours growth in presence of the drugs to which the inoculum had been added. Under the conditions of experiment, growth and multiplication of *E. histolytica* was inhibited by aureomycin at a concentration of 3×10^{-5} or above, but a concentration of chloromycetin more than 4 times greater was required to effect the same result. The evidence suggested an amoebicidal activity of both drugs at the higher concentrations. In the case of *T. hominis* similar concentrations of aureomycin were effective, but although growth and multiplication was inhibited by chloromycetin it did not kill all *T. hominis* at the concentration used. The streptobacillus present in the medium was sensitive to both drugs at certain concentrations. *J. D. Fulton*

BIEGELEISEN, J. Z. & SHAFFER, J. G. **The *in vitro* Effect of Aureomycin and Chloromycetin on Cultures of *Endamoeba histolytica* and *Trichomonas hominis*. II. The Disappearance of Organisms from Cultures treated with the Antibiotics.** *Amer. J. Hyg.* 1951, Mar., v. 53, No. 2, 146–51.

In continuation of the investigations described in Part I of this series [above] a study of the action of the two antibiotics was made on 48-hour cultures of both organisms in the same medium. After the 48-hour culture period in the absence of drugs, these substances were added in saline. On re-incubation for a further 24 and 48 hours the cultures were examined for the presence of cysts and the amoebae were counted. At concentrations slightly above 10^{-3}, chloromycetin caused the almost complete disappearance of *E. histolytica* after 24 hours and was more effective when allowed to act for a further similar period. At lower concentrations around 10^{-4} the drug was notably less effective. *T. hominis* was reduced in numbers at similar concentrations of this substance. Weight for weight aureomycin was more effective than chloromycetin with both organisms. The presence of *E. histolytica* cysts was not observed after drug treatment. *J. D. Fulton*

FULTON, J. D., JOYNER, L. P. & PRICE, I. N. O. **Studies on Protozoa. Part IV. A Complement-Fixation Test for Amoebiasis.** *J. Trop. Med. & Hyg.* 1951, Feb., v. 54, No. 2, 27–33. [12 refs.]

In this paper the authors describe the methods they used to assess the value of a complement-fixation test for the diagnosis of human amoebiasis. An

antigenic suspension of *Entamoeba histolytica* was prepared from a human strain, cultivated with *Bacterium coli* as the only growth-promoting micro-organism present. The culture medium was the "diphasic" type, consisting of coagulated whole egg overlaid with horse-serum-Ringer solution, and a small amount of sterile rice starch. To obtain adequate supplies of amoebae, flat 20-ounce bottles were used. Each bottle contained approximately one complete egg overlaid with 100 ml. of fluid. The bottles were seeded with the sediment from 3 to 6 tube cultures, and were then incubated for 72 hours. The supernatant fluid was siphoned off, the sediment collected, and the surface washed with phosphate-saline. Six to 12 bottles, giving a yield of combined sediment and saline of 80 to 100 ml. were used in each preparation. The suspension was centrifuged at 300 to 400 r.p.m. (diameter of centrifuge head 27 cm.) for 5 minutes, by which time the amoebae had sedimented, whereas most of the bacteria remained in the fluid. The sediment was washed in the centrifuge with the saline, and then resuspended in about 20 ml. of that medium. A sample was removed for estimating the concentration of amoebae by counting in a haemocytometer cell, and the suspension was again centrifuged at the same speed. The twice-washed sediment was next suspended in 2 ml. of distilled water, frozen and thawed 3 times, and then stored in a stoppered bottle in a mixture of alcohol and dry ice. The yield from 268 bottles was 568 million amoebae, but it was found later that this could be improved by adding 10 per cent. by volume of liver extract to the fluid part of the medium.

In the final stages of preparation the suspension was thawed, and centrifuged at 3,500 r.p.m. (diameter of centrifuge head 11 cm.) for ½ hour, or until no further sedimentation took place. The deposit, which consisted mainly of starch and bacteria, was discarded. The slightly opalescent fluid represented, in different preparations, from 2·8 to 5·4 million amoebae per ml. Experiments showed that the best way to preserve this antigen was to filter through a gradocol membrane of pore-size about 700 mμ, and then add formalin to 0·1 per cent. This procedure provided a water-clear fluid.

To standardize the antigen, the anticomplementary activities of a series of dilutions were first determined, in the presence of a 1/5 dilution of normal serum. For each dilution of antigen the least amount of complement which produced complete haemolysis was taken as the complement titre with that dilution, and the "dose" was calculated by increasing this quantity by one-fourth. The appropriate dose for each dilution of antigen was thus established. At the next stage, the optimum concentration of antigen was determined by testing, by the method of optimal proportions, the complement-fixing capacities of mixtures of different dilutions of antigen and of rabbit antiserum. Each batch of antigen was tested in the same manner.

Similar antigenic suspensions were prepared from *Entamoeba coli* grown in the medium consisting of inspissated horse serum, overlaid with Ringer-egg-white, and in the presence of a mixed bacterial flora.

A suspension of *Bact. coli* containing 200 million bacteria per ml. was heated at 56°C. for ½ hour, and preserved in 0·1 formol-saline. This antigen served as an additional control in the experiments with antisera produced by the injection of rabbits with the 3 antigens. When each antiserum was tested against the 3 antigens, a considerable degree of cross-fixation of complement was noted with heterologous antigens. This was thought to be due to the high antibody levels obtained by artificial immunization.

Qualitative tests were carried out on a number of human sera by allowing a single serum dilution of 1/5 to react with the optimum concentration of antigen and the appropriate dose of complement. The same dilution of serum, without antigen, was used as a control. A complete quantitative test, to determine the complement-fixing titre of the serum, was made when this

preliminary test gave a positive result. Full details of the technique are given, but they vary in no essential manner from the tests as usually carried out.

A total of 265 human sera derived from many sources was tested in this way, and 91 reacted positively. The highest titre was 1/80, and the average was 1/10. As regards the correlation between clinical and serological findings, it is noted that *E. histolytica* had been demonstrated in the stools of 83 of these 91 patients, and that one other had suffered from amoebiasis a year previously. Of the 174 negative reactors, 142 gave no clinical history suggestive of amoebiasis, but the remaining 32 showed either clinical or pathological signs of infection.

Parallel tests with *Entamoeba coli* were made in 38 instances, and gave the following results :—

Antigen	Pos. Sera	Neg. Sera
E. histolytica	23	15
E. coli	2	36

The significance of the positive results with *E. coli* is uncertain, because each serum reacted to the same titre with both species.

These results confirm the findings of other workers that specific antibodies are present in the serum of many patients harbouring *E. histolytica*. As in other infections in which serological tests are used for diagnosis, false positive and false negative reactions may occur. Complement fixation tests are not likely to be of much value in primary diagnosis, or in surveys of infection rates among the general population. They have, however, a potential value in the assessment of the results of treatment, and in providing evidence about the cause of hepatitis or liver abscess. The authors consider, however, that further investigations should be carried out in an endemic area, and that attempts should be made to improve the quality of the antigens used in the tests, so that the real value of the test can be established. *J. C. Broom*

ZINNEMAN, H. H. **Ten Cases of Amoebiasis with Arthritic Complaints.** *Amer. J. Digestive Dis.* 1950, Oct., v. 17, No. 10, 342–4. [16 refs.]

Autochthonously acquired amoebiasis is prevalent in the U.S.A. ; with increasing study of it the proportion of infections unassociated with symptoms decreases. Commonly these symptoms are referable to the abdomen ; but " myalgia, rheumatic complaints and even rheumatoid arthritis are possible symptoms or complications, of chronic amoebiasis, due to *E. histolytica* ". Ten cases of myalgias or arthritic complaints, all considered to be cases of rheumatoid arthritis, in association with an intestinal infection with *Entamoeba histolytica* are described ; all ten benefited dramatically from amoebicidal therapy. It is concluded that in every case of rheumatoid arthritis, arthralgia or myalgia, the stools should be examined ; if intestinal protozoal infections are found to be present their elimination may be expected to relieve these complaints.

A. R. D. Adams

SCHNEIDER, J. Essais de traitement de l'amibiase par deux dérivés thio-arsenicaux. Note préliminaire. [**Trials of Two Thio-Arsenicals in the Treatment of Amoebiasis.**] *Congrès Internat. Hyg. et Méd. Méditerranéennes Alger, 3, 4, 5 Avril 1950.* 139–42.

Search continues for new and more effective amoebicides as there is no method of treatment at present available which will afford a certain cure of amoebiasis. The amoebicidal value of two thio-arsenicals, under investigation for their trypanocidal properties, has been examined. These compounds are

of a constitution permitting of the administration of large quantities of arsenic in the trivalent form. The first of them, "carbamido-4-phenylarsino-dithioglycolate of sodium", was given to 6 patients in hospital in Paris who suffered from intestinal amoebiasis acquired overseas. On the first day 0·1 gm. of the drug in tablet form was given orally, on the 2nd day 0·2 gm.; and then 0·3 to 0·4 gm. was given daily in divided doses for 5 to 8 days. Symptomatic improvement was evident by the 2nd or 3rd day of treatment; in 5 of the 6 cases cysts had vanished from the stools by the 7th day, in the 6th case they disappeared in another day or two. In all 6 cases the stools subsequently remained free from parasites over a period of a week's observation. The drug caused some troublesome toxic manifestations in the form of nausea and a burning sensation in the epigastrium.

The second preparation, "melaminyl-4-phenylarsino-dithioglycolate of sodium", was given in enteric-coated tablets to obviate the digestive disturbances resulting from administration of the former compound. Twenty patients were treated with it; the dosage employed was similar to that already described, and it was found that this drug was much better tolerated than the former. Four of the patients suffered from acute amoebic dysentery, and 7 had chronic amoebiasis with symptoms. In every case treated the symptoms subsided and the parasites disappeared from the stools, though rather less rapidly than with the first drug described. It is evident that the thio-arsenicals possess amoebicidal activity. *A. R. D. Adams*

UZAN, M. Essais d'aureomycinothérapie dans certaines affections intestinales. [**Trial of Aureomycin in Intestinal Disorders.**] *Congrès Internat. Hyg. et Méd. Méditerranéennes Alger, 3, 4, 5 Avril 1950.* 136–8.

Three patients suffering from severe recto-colitis of non-specific aetiology, 3 patients with amoebiasis and an associated hepatitis, and 13 with subacute or chronic amoebiasis, were treated with aureomycin. The gross dosages employed ranged from 9 gm. to 40 gm.; the course of treatment was begun with 0·25 gm. on the first day; this was followed by 0·5 gm. on the second, 1·0 gm. on the third, and then 2 or 4 gm. daily thereafter. After the start of aureomycin treatment amoebae, when present, rapidly vanished from the stools; there was a marked and obvious modification of the flora of the stools, and the appearance of fungal organisms in them. In 17 of the cases there was rapid and pronounced amelioration of the symptoms, and in one case rather less obvious improvement; in only a single case, an amoebic carrier, was there no response to the drug. *A. R. D. Adams*

CARRI, E. L. & SCHISANI, J. O. Giardiasis intestinal. Su tratamiento por Nivaquine (3377 R.P.). [**Intestinal Giardiasis. Treatment by Nivaquine.**] *Semana Méd.* 1951, Apr. 12, v. 98, No. 15, 522–6. [24 refs.]

After brief reference to drugs previously given for treatment of giardiasis—aralen, pentaquine and paludrine [proguanil]—the authors give notes of 16 patients with infection by *Giardia intestinalis* treated by Nivaquine in doses of 3 tablets, each of 0·1 gm., daily, for adults for 5 days; for children under 10 years of age, the dose is halved. Of the 16 persons, 7 were male adults, 2 female, and 7 children. One, a man of 56 years, showed signs of intolerance of the drug, a feeling of weakness with gastro-intestinal disturbance; the rest bore the drug well. The clinical symptoms, which in most were rather vague—nervousness, poor appetite and sleeping badly—cleared up and in 6 of the 16 the protozoon could not be found after the course of treatment. [The authors state that they were careful to choose only those with "pure giardiasis—

patients with *G. intestinalis* only", but it will be noted in the detailed accounts that in one case, after the course, faecal examination showed *Entamoeba coli* and *Endolimax nana*, though no *Giardia* was seen, and in another *Endolimax nana*.] *H. Harold Scott*

TORRICO, R. A. Balantidiosis y frecuencia de balantidios en los cerdos de Cochabamba. [**Balantidial Infection of Man and Pigs in Cochabamba.**] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 43–7.

In 1938 a case of human balantidiosis was found in the local hospital; since then, examination of 5,499 faecal specimens has revealed 10 more cases, 9 with the parasite in the vegetative form, one with the cystic form only, and two were infested with helminths also. Four of the 10 were females and 6 were males; three were children aged 7, 10 and 12 years, the rest were adults over 20 years of age.

Four were designated healthy carriers or asymptomatic cases as they experienced nothing except mild abdominal pain and slight diarrhoea from time to time, with capricious appetite and flatulence after meals. Two complained of diarrhoea with pasty or muco-purulent and blood-tinged faeces, diffuse colicky abdominal pain and loss of weight. One patient exhibited more severe symptoms; for more than a year he had suffered from diarrhoea, 10 or more motions in the 24 hours, with mucus and blood, tenesmus and acute abdominal pain. He was also infested with hookworms, *Ascaris lumbricoides*, *Trichuris trichiura* and larvae of *Strongyloides stercoralis*. His red corpuscles were down to 1,670,000 per cmm. and leucocytes 9,700; the differential count was within normal limits; there was no eosinophilia. In other cases the red cells were about 4 million and eosinophilia was not constant. One other patient, a man of 55 years, suffered from dysenteric symptoms with acute abdominal pain which gave him no rest, day or night, accompanied by cold sweats and a burning sensation, and 20 or more stools in the 24 hours, small and consisting chiefly of blood-tinged mucus. He was given metoquine in 0·1 gm. tablets three times a day and improvement was very rapid; the pain was relieved, the stools became faecal and the ciliate was not found after 6 days.

All the patients came from rural districts which had no proper provision for drinking-water; this they obtained from wells, rivulets and pools, unprotected and liable to gross contamination by man and pigs. Examination of 171 pigs from different parts of Cochabamba revealed 72 to be infected with *Balantidium coli* (42·1 per cent.), 52 with the cystic forms and 20 with the vegetative form.

H. Harold Scott

NEGHME, A., MIRANDA, M., AGOSIN, M. & SANZ, R. Contribución a la quimioterapia del *Balantidium coli*. II. Estudio Clinico. [**Chemotherapy of *Balantidium coli*. II. Clinical Study.**] *Bol. de Informaciones Parasitarias Chilenas.* 1951, Jan.–Mar., v. 6, No. 1, 7–8.

The English summary appended to the paper is as follows:—

"The authors have treated four cases of human balantidiasis with Aureomycin and one case with Terramycin; the results have been very good. The *Balantidium coli* trophozoites disappeared from the stools from the 2nd to the 4th day after the beginning of the treatment. Both drugs were well tolerated and gave a rapid clinical improvement of the condition of the patients."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

LEVADITI, C., VAISMAN, A. & CHAIGNEAU, H. Culture du *Spirochaeta duttoni* dans l'oeuf fécondé de poule. [**Culture of *Spirochaeta duttoni* in the Fertilized Egg of the Fowl.**] *Ann. Inst. Pasteur.* 1951, Jan., v. 80, No. 1, 9–20, 6 figs.

The authors confirm the observations by CHABAUD [this *Bulletin*, 1940, v. 37, 200] that *Spirochaeta duttoni* will develop in the incubated fowl's egg. They inoculated eggs, after 6 to 10 days' incubation, with the blood of infected mice, and in all cases the eggs developed an intense spirochaetal infection of the allantoic membranes after 5 to 15 days, and the embryos remained alive except those opened on the 15th day. Four consecutive passages were made from egg to egg and the last two showed an increase in the prevalence of brain infections.

The lesions and microscopic appearances of the infected tissues are described in great detail and illustrated by six photomicrographs. *E. Hindle*

YAWS

SEPULVEDA, G., Jr. & IBARRA, L. M. **A Critical Study of the Quantitative Kahn Test (Blood) in 100 Cases of Yaws.** *J. Philippine Med. Ass.* 1949, Oct., v. 25, No. 10, 487–9.

These authors submitted sera from 100 cases of clinical yaws to the quantitative Kahn test ; patients included 4 with primary, 14 with primo-secondary, 60 with secondary, 14 with tertiary and 8 with latent yaws.

In primary cases, Kahn units (K.U.) varied from 20 to 120, in primo-secondary from 20 to over 320, in secondary from 3 to over 320, in tertiary from 40 to over 320 and in latent from 40 to over 320 ; in all, 94 per cent. of cases had titres of over 20, and 30 per cent. titres of over 320 K.U.

From the above it is concluded that quantitative Kahn tests are of no value in differentiating syphilis from yaws and that a high titre does not necessarily indicate syphilis. *T. E. Osmond*

MONTEL, L. R., LE GAC, P. & MULET, M. Nouveaux cas de pian traités par l'huile de chaulmoogra. Documents photographiques. [**New Cases of Yaws treated with Chaulmoogra Oil.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 173–4, 4 figs. on pls.

The authors refer to two new cases of yaws treated with chaulmoogra oil from *Taraktogenos Kurzii* : the oil was neutralized, but not treated with guaiacol.

The first patient, a boy of 6, had secondary lesions for about 2 months on the face, neck, arms and back. He received 1 cc. of the oil intramuscularly at intervals of one or two days for six injections : cicatrization began after the second injection, most of the lesions had disappeared by the fourth and clinical cure was complete after the sixth injection.

The second patient was a girl of 6, with ulcerated lesions on the forehead, neck, back and arms, which had been present for about a month. The results were similar to those found in the first patient, although only five injections were given.

Photographs of these two African children before and after treatment show a remarkable clearance of the lesions. [For previous cases treated by the authors, see this *Bulletin*, 1951, v. 48, 472.] *H. J. O'D. Burke-Gaffney*

LEPROSY

LEPROSY IN INDIA. 1951, Jan., v. 23, No. 1, 1–111, 3 figs. **All-India Leprosy Conference, 1950, Madras.**

This whole number is devoted to the Third All-India Leprosy Workers' Conference, which met in Madras in October 1950, under the auspices of the Hind Kusht Nivaran Sangh, which has taken the place of the Indian Council of the British Empire Leprosy Relief Association. An interesting paper was read by the officer who has acted as Honorary Secretary of this earlier body since its initiation 25 years ago, describing its activities during that period.

This was the third conference of its kind to be held, the first having been at Wardha in 1947, and the second at Calcutta in 1948. The inaugural address, given by the Madras Minister of Health, emphasized the importance of preventive work in the villages where leprosy has its origin. This was also stressed in the Presidential Address, and it was also shown that in spite of great advance in our knowledge about leprosy during the last 30 years there is no sign of any diminution in its incidence in India. Naturally the chief interest at the Conference centred round sulphone therapy. Several papers were read on this subject and there was general agreement on the value of these drugs in the treatment of leprosy. The most important point of discussion was the toxicity of DDS, whether it could be introduced in leprosy out-patient clinics, and if so what precautions should be taken. Some preferred parenteral injection of sulphetrone, but the general trend of opinion among those with most experience was that we have in DDS a remedy for leprosy as effective as any other form of sulphone, which is so cheap that it may be placed within the reach of even the poorest, and which is safe, provided certain simple precautions are taken.

Another matter of special interest was the prevention and treatment of deformities by physiotherapy and plastic surgery; it was also considered that there was reason for hope that deformities would be prevented to a large extent by early treatment with sulphones.

An important side-issue of the Conference was the formation during its session of the Leprologists Association of India. *Ernest Muir*

TELKKÄ, A., PUTKONEN, T., TEIR, H. & HORTLING, H. **Leprosy. A Case Report, with a Discussion of Diagnostic Difficulties and the Present Incidence of Leprosy in Finland.** *Ann. Med. Intern. Fenniae.* Helsinki. 1950, v. 39, No. 4, 263–78, 9 figs. [19 refs.]

"A case of leprosy is reported, a woman of 27 years in whom cutaneous lesions appeared at the age of 8. They grew larger and became annular and anesthetic in the centre. Extensive neurotrophic changes appeared in the bones. Bacilli were not found. The Mitsuda reaction was negative twice; histologic examination showed cutaneous and nerve lesions characteristic of leprosy. The case does not definitely fall under any of the headings of the new classification (lepromatous, tuberculoid, indeterminate leprosy). It is most probably some pretuberculoid form. A short survey of the incidence of leprosy in Finland is given."

MONTEL, L. R. Affinités tinctoriales du bacille de la tuberculose aviaire (méthode de Macchiavello). Comparaison avec le bacille de Koch, avec le bacille de Hansen et le bacille de Stéfansky. [**Staining Properties of the Avian Tubercle Bacillus by Macchiavello's Method, compared with the Tubercle Bacillus, Leprosy Bacillus and Stéfansky's Bacillus.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 47–9, 1 fig.

The following is a translation of the author's summary :—

The "negative" appearance of acid-fast bacilli stained by Macchiavello's method seems to follow a descending curve, at the summit of which is found the leprosy bacillus which is easily seen in the "negative" [unstained form] and is very refractile : Stéfansky's bacillus is next, it is easy to see but less refractile and finally, the avian and other tubercle bacilli, which are difficult to see and are only very slightly refractile. [See also this *Bulletin*, 1946, v. 43, 1152 *bis* ; 1947, v. 44, 322.] *H. J. O'D. Burke-Gaffney*

DUBOIS, A. & SWERTS, L. L'emploi du microscope à fluorescence dans le diagnostic de la lèpre. [**Use of the Fluorescent Microscope in the Diagnosis of Leprosy.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1473–5.

The following is a translation of the authors' summary :—

The results of employing the fluorescent microscope do not appear to compensate for the more complicated form of examination and the expensive apparatus which does not seem likely to solve the problems of bacteriological examination in leprosy. *H. J. O'D. Burke-Gaffney*

LAVIRON, P. & LAURET, L. Chaulmoogriques et sulfones dans la thérapeutique de la lèpre. [**Chaulmoogra and Sulphone Preparations in the Treatment of Leprosy.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1950, v. 7, No. 2, 199–208.

The authors discuss the relative values of chaulmoogra oil and sulphones in the treatment of leprosy. They are at present using a combination of the two methods, giving their patients one or two injections per week of Cimédone [sulphetrone] or DDS and of chaulmoogra two injections per month, with particularly interesting results. *Ernest Muir*

HUECK, O. Erfolge der Diasone-Behandlung bei Lepra. [**Results of Diasone Treatment of Leprosy.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Apr., v. 2, No. 4, 513–22.

After reporting figures of leprosy patients treated with chaulmoogra preparations in the past at a Mission Hospital in Tungkun, S. China, the author gives details of the results of administration of diasone to 57 patients in 1948. Briefly, of the total, 51 improved, 5 remained unchanged, and one became worse. [He calls this "improvement in 89 per cent.".] In 1949, 88 received diasone treatment and 68 improved, 17 remained unaffected and 3 were worse. The improved patients showed definite amelioration clinically, the bacilli were fewer, nodules and infiltrations became flatter, smaller and even disappeared, ulcers healed, the nasal passages cleared and the voice became less hoarse, eyebrows grew again, and so on. The diasone was given in tablets up to 0·3 gm. daily. It was soon found that if the dose was increased too quickly reaction might be marked. Thus, one man, given 4 tablets daily, exhibited a severe dermatitis, albuminuria, general oedema, and especially of the face, with high fever and, later, obstinate eczema and desquamation.

The author's method was to give one tablet daily (0·3 gm.) for 6 days in the week and for 3 weeks ; this was followed by a week's pause ; then 2 tablets daily for the 6 days for 3 weeks and again a week's pause, and, finally, 3 tablets daily for 3 weeks. Of 67 patients noted, 3 went up to 5 tablets daily, 20 reached 4, 26 three, 11 had two and 7 had only one. Anaemia might be found, but in some at least this was due to ankylostomiasis. Trophic ulcers were treated successfully with sulphanilamide powder.

Details are given of four patients ; their condition on starting the treatment, the amount of diasone given and the final results. Briefly, (1) a woman of 36 years, with lepromatous form, took, in 1948, a total of 462 tablets, in 1949 she had 792 and up to June 1950 she had 384, or 1,638 (491·4 gm.) altogether. She improved greatly ; the nodules disappeared, bacilli were no longer found and she was able to do some work. (2) A woman of 29 years, also a lepromatous case, received 666, 864 and 360 in successive years (the last up to June only), a total of 1,890 tablets, or 567·0 gm., and improved as in the case of the last patient. (3) A man of 26 years with marked lepromata and anaesthetic patches in legs, feet and face ; he had been under the treatment for a comparatively short time, receiving 134 tablets in 1949 and 288 in 1950 up to June, a total of 422 tablets (126·6 gm.). He improved much, bacilli were fewer and the facial infiltrations reduced. (4) A girl of 18 years, with lepromatous leprosy ; she was given 255 tablets in 1948, 648 in 1949 and 234 up to June, 1950 ; 1,137 tablets (341·1 gm.) altogether. The nodules and the skin condition greatly improved, the bacilli became less numerous and she was able to work. The author agrees with Muir that " in lepromatous leprosy no drug is so generally beneficial as diasone ".

H. Harold Scott

FLOCH, H., DESTOMBES, P. & LECUILLER, A. Sur l'emploi de la sulfone-mère en suspension huileuse. [**The Use of the Parent Sulphone in Oily Suspension.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 103–9.

The authors state their preference, when injecting diaminodiphenyl sulphone, for a suspension in normal saline rather than in arachnis or chaulmoogra oil. They deprecate the use of chaulmoogra oil as being of no additional value in the treatment. They also state that when the weekly dose of 1·20 gm. of DDS is suspended in oil instead of in normal saline there is an irregular blood concentration varying from 2·8 mgm. per 100 cc. to a mere trace. In one patient 48 hours after a second weekly injection the blood concentration rose to 25 mgm. per 100 cc. In the discussion following the paper, J. SCHNEIDER points out that there must be something wrong with the calculation as, supposing there only to be 5 litres of blood in the body, 25 mgm. per 100 cc. would mean 1·25 cc. in the blood circulation alone, more than the amount injected at one time, apart from whatever amount there might be in the other fluids and tissues of the body ; also that he (Schneider) had never obtained a concentration of more than 5 or 6 mgm. per litre of blood after injecting 1·25 gm. of oily suspension of DDS. [Possibly the irregular concentrations may be due to the use of an irritant form of oil as the suspending agent, or to injecting intramuscularly instead of subcutaneously in which it is more difficult to obtain quick dispersion by local massage ; in either case depôts might be formed which might lead to greatly varying concentrations.] *Ernest Muir*

TOLENTINO, J. G. **A Proposed Modification of the Segregation of Leprosy Cases in the Philippines.** *J. Philippine Med. Ass.* 1951, Jan., v. 27, No. 1, 21–6. [11 refs.]

The author gives the history of segregation for leprosy in the Philippines. In 1906 it was first begun with a prediction that there would be no more leprosy

in 10 years. In 1920, as there was no improvement, segregation was intensified. In 1930, as the incidence was no less, attention was in addition given to early detection of cases. In 1941 when war broke out leprosy was just as common, and now in 1951 there is no sign of its declining.

It is pointed out that early cases are not infectious, and advanced cases are avoided and so do not have much chance of spreading infection. It is the moderately advanced cases who spread the disease before they are recognized as a danger by the public. The author accepts Molesworth's theory that "leprosy can be eradicated, not by segregation, not by treatment, not by any health measures but by natural selection, the susceptibles being gradually eliminated leaving only the resistant stock behind". He makes the extraordinary statement that "only children below five are considered susceptible" and says that "only about 50 per cent. of these children get the disease in spite of their prolonged and very intimate association with very infectious cases" in the Culion Leper Colony. He recommends that as compulsory segregation of cases for 44 years has failed, and as advanced cases are segregated only after they have already infected others, and when they can no longer infect anybody because they are already shunned and avoided, the compulsory provision of the law should be removed, and leprosaria should be maintained only for whoever wants to be treated, just as sanatoria are being maintained for the tuberculous.

[The article contains many loose and doubtful statements, but there is a certain amount of reason in the arguments. No reference is made to the more favourable prognosis under sulphone treatment. If the author's recommendation of *laissez faire* were carried out it would be interesting to note the results after another 44 years.] *Ernest Muir*

HELMINTHIASIS

Colglazier, Merle L. & Enzie, F. D. **Notes on Caricide as an Anthelmintic for Cats and Dogs.** *Proc. Helminthological Soc. of Washington.* 1951, Jan., v. 18, No. 1, 50–52.

Bequaert, J. C. & de Lucena, D. T. Introdução no Brasil de duas espécies africanas de caramujos transmissores da esquistosomose—*Bulinus tropicus* (Krauss) e *Biomphalaria alexandrina pfeifferi* (Krauss). [**Introduction into Brazil of Two African Vectors of Schistosomiasis.**] *Rev. Brasileira Med.* Rio de Janeiro. 1951, Mar., v. 8, No. 3, 167–70, 1 fig. English summary.

Among a number of snails from Santos in the State of São Paulo, Brazil, the authors found two species new to their experience and breeding in ditches about the city and in the municipal gardens. These were *Bulinus tropicus* and *Biomphalaria alexandrina pfeifferi*. Detailed descriptions of these are given. The authors say that some of the snails previously collected and ascribed to the genus *Australorbis* were undoubtedly *Biomphalaria alexandrina pfeifferi*. This is known to be the intermediate host of *Schistosoma mansoni* in Africa—Sierra Leone, Liberia, the Gold Coast, Nigeria, the Belgian Congo, Angola, Northern and Southern Rhodesia, the Transvaal and other places, while *Bulinus tropicus* is the vector of *S. haematobium* and possibly of *S. mansoni* in S. Africa. Up to the present *S. haematobium* infestation is not known in Brazil.

The authors believe that these snails were introduced in barrels of water brought from Africa in slave trade times, and when the barrels were washed out at Santos, before refilling with fresh water, the snails were left behind.

H. Harold Scott

GHYOOT, E., DELVILLE, J. P. & DE BIE, P. Note à propos d'un cas de bilharziose sans manifestations cliniques avec localisation massive d'oeufs dans le foie. [**A Case of Schistosomiasis without Clinical Manifestations with Massive Localization of Ova in the Liver.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1495–8.

The following is a translation of the authors' summary :—

Record of a case of schistosomiasis in which the characteristic symptoms were never manifested and which was discovered only at autopsy.

H. J. O'D. Burke-Gaffney

BADIR, G. **Schistosomiasis of the Conjunctiva.** *Bull. Ophthalm. Soc. Egypt.* 1946, v. 39, 52–60, 3 pls. [14 refs.]

Schistosomiasis of the conjunctiva is very rare in relation to the number of patients affected with schistosomiasis in Egypt. So far only 9 cases have been reported, 7 boys and 2 girls aged from 5 to 12 years. Pathological examination of all the above specimens revealed the presence of *S. haematobium* ova only in the granuloma. The presence of the worms could not be detected.

The author describes a case which is the first that has been reported, in which the adult worms, male and female, were observed in a dilated orbital vein under the conjunctiva. He also discusses at length the channels through which the worms reach the subconjunctival tissue. *E. O'G. Kirwan*

BURTNER, O. W. **Schistosomiasis Japonica in American Soldiers in the Philippines. A Clinical and Laboratory Study of 297 Treated Cases.** *J. Philippine Med. Ass.* 1950, Dec., v. 26, No. 12, 537–54, 3 charts.

Two hundred and ninety-seven American soldiers were treated for *Schistosoma japonicum* infection at a hospital in Leyte between March and August, 1945. There is an account of the incubation period, symptomatology and physical and laboratory findings in these cases, most of which were classified as mild or moderately severe. These details are elaborated in a number of tables and graphs [which should be studied in the original]. Proctoscopy was found to be valuable in diagnosis, both because lesions characteristic of the infection were frequently seen, and because eggs could be obtained from scrapings or swabs of the mucosa in many instances. Cerebral involvement was observed in ten patients 2 to 6 weeks after the onset of illness ; this took the form of complete hemiplegia in 3 cases, meningo-encephalitis with paralysis of one extremity in 2 cases, and paralysis of part of one extremity in another 5 cases. Between 20 to 40 days after the onset of the illness changes in the lungs, sometimes evident clinically, were found on X-ray examination in some cases ; these chiefly took the form of "a bronchiolitis with fairly consistent peribronchial accentuation accompanied by minimal mottling", but other radiological changes were occasionally observed. Although a high eosinophilia, reached on an average in 47 days after the onset of illness, was encountered at times there was no constant correlation between the severity of the illness and the eosinophil count.

The drugs used in treatment were fouadin or tartar emetic ; the former caused no manifestations sufficiently severe to necessitate its stoppage ; the latter sometimes caused such severe toxic symptoms as to require a reduction in dosage or stoppage of the treatment. Treatment with the heavier course (1·92–2·03 gm.) of tartar emetic used cured the 20 patients to whom it was given ; treatment of 36 patients with the heaviest course (60–90 cc.) of fouadin given cured all but three of them. Lesser courses of either tartar emetic or of fouadin treatment did not produce so good a cure rate ; the overall relapse rate was 11·8 per cent. of the 297 patients, who were re-examined for an average of 44 days after completion of treatment. *A. R. D. Adams*

SCHWETZ, J., with the collaboration of H. BAUMANN & M. FORT. Note préliminaire sur *Schistosoma rodhaini* Brumpt. [**Preliminary Note on** *Schistosoma rodhaini*, **Brumpt.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1549–51.

WERY, J. E. La schistosomiase bovine au Ruanda-Urundi. [**Bovine Schistosomiasis in Ruanda-Urundi.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1613–14.

READ, C. P. **The "Crowding Effect" in Tapeworm Infections.** *J. Parasitology.* 1951, Apr., v. 37, No. 2, 174–8, 3 figs. [15 refs.]

NÁJERA, L. & CONEJOS, M. Sobre el hallazgo de cisticercosis cardiaca en el zorro. [**Cardiac Cysticercosis demonstrated in a Fox.**] *Rev. Ibérica de Parasitología.* 1951, Jan., v. 11, No. 1, 11–21, 5 figs. [15 refs.]

SOROUR, O., GUIRGUIS, S. & HALIM, S. A. **Hydatid Cyst in the Peritoneum with Bilharzial Infiltration of its Fibrous Walls.** *J. Roy. Egyptian Med. Ass.* 1951, v. 34, No. 3, 171–6, 4 figs. on 2 pls.

PAILLAS, J. E. & TAMALET, J. Les kystes hydatiques du cerveau. (A propos de deux cas observés chez l'enfant.) [**Hydatid Cysts of the Brain. Two Cases seen in Children.**] *Méd. Trop.* Marseilles. 1951, Jan.–Feb., v. 11, No. 1, 89–100, 3 figs.

COUTELEN, F. Réapparition de porteurs d'ankylostomes dans les houillères nationales du Nord et du Pas-de-Calais. [**Reappearance of Hookworm Carriers in the National Coal-Mines of the Nord and the Pas-de-Calais.**] *Bull. Acad. Nat. Méd.* 1951, v. 135, Nos. 3/4, 60–63.

The author, with two collaborators, examined the stools of 115 Italian miners in the foreign colony at Muerchin and found in May and June, 1949, that 6 (5·21 per cent.) of them were hookworm carriers. These were transalpine workers employed by the Immigration Service, whose stools had not been examined before they had left Italy. Of the 6 infected men, 5 had done agricultural work in Italy and one had worked on road-tunnels and later in the Bolzano mines.

In June, 1949, the same observers discovered another source of hookworm infections in the mines. This time it was a Frenchman repatriated from Indo-China and sent back, at the end of his term of military service, to his former occupation as a miner. He had been sent to the St. Saviour Hospital at Lille with symptoms of acute dysentery and "dysentery amoebae" and hookworm eggs were found in his stools.

This reappearance of hookworm carriers seems to be a recent importation, because earlier examinations of both native and foreign workers had been negative ; but it had not been possible to make more than one examination of each stool, although all examinations were done by a concentration method.

The medical authorities of the mines were informed and they at once instituted (1) clinical examination and treatment, under laboratory control, of the carriers detected, who were returned to work only after complete removal of the hookworms ; (2) examination at the enrolment station of the stools of all the Italians and persons repatriated from Indo-China.

By December, 1950, the author and his collaborators had found the 6 carriers mentioned above, 5 new ones among 659 Italians presenting themselves for work in the mines and 5 carriers among 28 Frenchmen repatriated from Indo-China, one of whom was already working below ground, while 4 were awaiting enrolment.

Thus, although only one stool examination was possible, it showed that 17·85 per cent. of the Frenchmen repatriated from Indo-China were infected. The author's earlier work (*Gazette méd. de France*, 1950, v. 57, 857) showed that if several stool examinations had been possible, a higher percentage of infected men would have been found.

Clinical examinations made by the medical services of the mines showed that only 6 of the infected men showed symptoms and that these were vague. This agrees with the work of GARIN on infected miners of the Loire basin. Two of the 6 had some gastro-intestinal troubles, 3 had slight epigastric pain, which was either spontaneous or elicited only by pressure, and one had a slight systolic murmur which disappeared on forced inspiration. One other patient repatriated from Indo-China, a malarial subject, had acute dysentery and "parasitic hepatitis".

Results are given of the examination of the blood of the 16 carriers mentioned above. The numbers of red blood cells were below normal in 12 carriers, the haemoglobin level of all was subnormal and the colour index of all was below unity ; two had a leucocytosis, 3 had a leucopenia and 14 had an increased number of mononuclears. Eosinophils varied from 5 to 22 per cent. in 12 subjects, but most of these had either *Ascaris* or *Trichuris* or both. In the one who had an eosinophilia of 22 per cent. one stool examination revealed hookworms only. Thus all the carriers showed abnormalities of the blood and 12 had a hypochromic anaemia in progress, like that described by numerous authors.

The author discusses the risks created by his discovery of these carriers and concludes that the search for them should be continued and that those found should be treated. This search should be extended to other groups of men in the Nord and Pas-de-Calais and systematic examination of men presenting themselves for work in the mines should be undertaken again, before the men are sent to work underground. French and foreign miners returning from areas in which ankylostomiasis is endemic should certainly be examined and special and more immediate attention should be given to men returning from Indo-China.

G. Lapage

REESAL, M. R. **Observations on the Development of** *Strongyloides agoutii* **of the Agouti in the Guinea Pig.** *Canadian J. Zool.* 1951, Apr., v. 29, No. 2, 116–20, 17 figs.

REESAL, M. R. **Observations on the Biology of the Infective Larvae of** *Strongyloides agoutii*. *Canadian J. Zool.* 1951, Apr., v. 29, No. 2, 109–15. [21 refs.]

SANDARS, Dorothea F. **Viability of *Ascaris lumbricoides* Eggs "Preserved" in Formalin.** [Correspondence.] *Nature.* 1951, May 5, 730.

In Brisbane in March 1950 a faecal specimen containing *Ascaris lumbricoides* was preserved with hot 10 per cent. formalin. In May and August, when it was used for teaching purposes, nothing unusual was noted. In November, during an examination, it was noted that many of the *Ascaris* eggs contained actively moving developed larvae. The temperature was 77°F. ; on a cooler day (70°F.) no larval activity was seen, but it reappeared when the slide was warmed. Chemical analysis indicated that the formalin concentration in the specimen was not less than 6 per cent. (2·4 per cent. formaldehyde).

Another specimen was similarly preserved, but relatively less faeces were added : this proved to have a formalin concentration of 18·5 per cent. (7·4 per cent. formaldehyde). This specimen had been preserved in a screw-topped jar which would permit evaporation of the water and probably polymerization of the aldehyde. In this specimen the *Ascaris* eggs had not developed at all.

Between March and November, the temperature range was between 42·8°F. min. and 92·7° F. max.

It is suggested that the lower limit of formalin concentration may indicate the point below which bacterial growth is inhibited and development of the egg stimulated, while the upper limit is the concentration necessary to kill, fix and preserve the eggs. *H. J. O'D. Burke-Gaffney*

O'CONNOR, G. R. **Morphological and Environmental Studies on the Hatching of Ascarid Eggs** *in vitro.* *J. Parasitology.* 1951, Apr., v. 37, No. 2, 179–82, 1 pl.

KARODE, N. R. **Allergic Manifestation of Roundworm Infection.** *J. Indian Med. Ass.* 1951, Apr., v. 20, No. 7, 260.

CAMARGO L., H. Perforacion del estomago por *Ascaris lumbricoides.* [**Perforation of the Stomach by** *Ascaris lumbricoides.*] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 39–42.

HUARD, P. Les lésions génitales des filariens à Hanoi. [**Genital Lesions in Filariasis at Hanoi.**] *Méd. Trop.* Marseilles. 1949, Nov.–Dec., v. 9, No. 6, 883–95, 4 pls.

In the 51 observations the author has published, the diagnosis of filariasis has usually been established by the employment of several different methods. The findings are summarized as follows :—

	Total number	*Total positive*
Microfilariae in the blood	48	37
Microfilariae in the pus from abscess of epididymis	3	1
Microfilariae in the urine	7	0
Microfilariae in hydrocele fluid ...	14	7
Recovery of portions of adult worms in lymphatic tissue removed at operation	3	1
Demonstration of adult worms in biopsy specimens	30	16

Forty-nine cases were operated on in the following manner :—

	Cases
Unilateral epididymectomy	4
Unilateral castration	1
Unilateral epididymectomy with obliteration of the tunica vaginalis	22
Bilateral epididymectomy with obliteration of the tunica vaginalis	1
Excision of the tunica vaginalis	1
Resection of lymphatic varices of the cord ...	11
Suspension of the cord	1
Inversion of the tunica vaginalis...	13
Excision of chylous cyst of the cord	1
Incision of abscess of the cord	1

The pathological anatomy and clinical features of the lesions are discussed at some length. *P. Manson-Bahr*

MINNING, W. & DING, Pao-chuan. Hetrazan-Wirkung bei Frosch-Filariasis (*Icosiella neglecta*). [**The Effect of Hetrazan in Frog Filariasis.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Apr., v. 2, No. 4, 535–43, 1 fig.

The English summary appended to the paper is as follows :—

" Effect of Hetrazan in frog filariasis was studied experimentally. Green water frogs (Rana esculenta) naturally infected with Icosiella neglecta were given oral doses of Hetrazan for 10 to 21 days ; total dosage varied from 630 to 3000 milligrams per kilogram of body weight. After three days treatment already, the number of microfilariae was reduced to about 25 per cent. 13 out of 16 frogs became free of microfilariae within 21 days. It did not matter whether Hetrazan was given once daily or divided into three doses. Some frogs whose peripheral blood was freed after treatment still showed microfilariae in the blood of heart and liver. Also the number of adult worms seems to be reduced by Hetrazan. A total of 11 adult worms were found in 14 treated frogs as compared to 55 worms in 16 untreated frogs."

SYMMERS, W. St. C. **Pathology of Oxyuriasis with special reference to Granulomas due to the presence of** *Oxyuris vermicularis* (*Enterobius vermicularis*) **and its Ova in the Tissues.** *Arch. Pathology.* 1950, Oct., v. 50, No. 4, 475–516, 10 figs. [Refs. in footnotes.]

The paper, from Birmingham, England, opens with a very valuable and comprehensive account of enterobiasis from the epidemiological, clinical and pathological points of view, which is quite unsuitable for summary. The author points out that while the main symptoms of enterobiasis are connected with the irritation caused at night by the migrations of the female worm in the peri-anal area, numerous writers have associated intestinal symptoms with normal or heavy intestinal infections and have described a great variety of symptoms associated with threadworms in atypical sites. Threadworms have been found in the nose, mouth, oesophagus, stomach, urinary bladder which they reached in the female *via* the urethra, vagina, uterus, tubes and peritoneum. Although there is a considerable literature on the subject of the appendix and *Enterobius vermicularis*, there is little convincing evidence that the worm was primarily responsible for the lesions described and the author concludes his discussion on intestinal lesions generally with the remark " In none of the cases reviewed is there a clear causal relationship between the infestation and the intestinal lesions ". Of the 23 cases of invasion of the

peritoneum quoted from the literature, the author considers that in all but 5 the presence of the worm was of no clinical significance as the intruder was being dealt with as a sterile foreign body by the development of a sclerosing granulomatous reaction.

Three examples of *Enterobius* invasion of parenteral tissues in the author's personal experiences are reported.

The first was observed in a total hysterectomy specimen. There was a small nodule (1·1 by 1·1 by 0·8 cm.) in the meso-salpinx. The cut section showed an outer rim of firm, translucent, greyish-white tissue sharply demarcated from a greyish-yellow central zone of softer consistency.

In the other zone, here and there in the marginal area between the capsule and the necrotic centre, small pseudotubercles had formed ; they consisted of more or less radially arranged epithelioid cells, with occasional multinucleated giant cells, and sometimes there was a narrow rim of fibrosis around them. Some of the giant cells had formed around amorphous eosinophil material, in which an occasional ovum was seen.

In the central necrotic zone, which consisted mainly of a structureless mass of degenerated cells, there were numerous threadworm ova, discrete or in clumps, and also Charcot-Leyden crystals. Parts of the chitinoid cuticle of an adult worm were present and in one section there was a cross section of the tail end of a worm.

The second instance was a very similar one ; in this a small nodule was removed from the surface of the uterus at operation. Sections showed the same two zones and *Enterobius* ova, but no recognizable remains of an adult worm and no crystals were found.

The third specimen was the remains of a non-functioning kidney removed from a boy of 14 years who had a sinus in the loin connected with the kidney. The specimen consisted mainly of a fibrous mass with little kidney tissue and occasional necrotic areas. In the stump of the ureter, a gravid female *Enterobius vermicularis* was found. The necrotic foci and the tissues immediately surrounding them showed a picture identical with that of the nodule in the first case, including sclerotic pseudotubercles with foreign-body cells around single identifiable ova.

The question is discussed as to the route of invasion in this case. The possible routes are *via* the ureter, directly from the bowel (there was a history of two perinephric abscesses and the bowel was adherent at operation), or *via* the sinus in the loin ; the last-named is considered the most probable. The boy was known to be infected seven years previously and still had an intestinal infection with threadworm. *L. E. Napier*

ALBA V., M. & JARPA G., A. Triquinosis en ratas del Matadero Municipal de Santiago, Chile. [**Trichinosis in Rats in the Municipal Abattoir in Santiago, Chile.**] *Bol. Informaciones Parasitarias Chilenas.* 1951, Jan.–Mar., v. 6, No. 1, 7.

The English summary appended to the paper is as follows :—

" The authors have examined the diaphragm and intercostal muscles of the 100 rats (*Epymis* (*Rattus*) *norvegicus*) trapped at the Municipal Abattoir of Santiago and they found 10 infected with *Trichinella spiralis* cysts."

DEFICIENCY DISEASES

HOLLAND. **Malnutrition and Starvation in Western Netherlands.**

This book is reviewed on p. 766.

VAN VEEN, A. G. **Problems of Nutrition in the Tropics.** *Amer. J. Trop. Med.* 1951, Mar., v. 31, No. 2, 158–62.

This is a short and clear summary of some of the main nutritional problems in the tropics. The author has had a wide practical experience in Indonesia and other parts of the Far East. Any physician about to set out for the first time to the tropics would profit from reading this straightforward statement of present problems. *R. Passmore*

CHICK, Harriette. **The Causation of Pellagra.** *Nutrition Abstracts & Reviews.* 1951, Jan., v. 20, No. 3, 523–35. [Numerous refs.]

This review covers the many theories of the causation of pellagra since the disease was first recognized as a clinical entity in Spain just over two hundred years ago. The review is an elegant and complete piece of scholarship and so is not susceptible to abstraction. All nutrition workers are strongly advised to read it.

A real difficulty in establishing the true aetiology of the disease lies in the now undisputed fact that, although epidemics of pellagra only arise among maize-eaters, many isolated cases have arisen under a variety of circumstances. The human mind, ever prepared to assay a fresh attempt to simplify what is essentially complicated, has produced many theories based on the assumption that pellagra is caused either by some toxin present in the food or by a simple dietary deficiency. It appears now to be certain that the true cause of pellagra is much more complicated and consists in the disturbance of a delicate chemical balance between certain toxins or poisons, present in relatively large amounts in maize, and some essential dietary factors. Nicotinic acid and tryptophan are two of the latter, but the chemical composition of the poison or poisons is not known. There are analogues of nicotinic acid which can produce pellagra-like effects in animals, but it is uncertain whether these are the poisonous substances present in maize. The full story is not yet known ; pellagra is undoubtedly an intricate problem of biochemical balances. This review gives a lucid account of the fascinating story, as far as it has yet been unfolded.

R. Passmore

AL-WITRY, H., SHABY, J. A. & KANTARJIAN, A. D. **Nutritional Paraplegia in Iraq.** *J. Faculty of Med., Baghdad, Iraq.* 1950, Sept.–Nov., v. 14, Nos. 5/6, 143–7.

European and North American textbooks of general medicine are in many respects not transportable to Asia and Africa. This particularly applies to the sections on neurology. Thus diseases such as disseminated sclerosis and sub-acute combined degeneration of the cord, which rightly receive great attention in our textbooks, are rarities in most parts of the tropics. On the other hand spastic paraplegias of uncertain origin, which are seldom seen here, are common in many tropical countries. The authors describe 84 cases of spastic paraplegia occurring among 2,530 neurological patients admitted to the Royal Hospital, Baghdad. The neurological features were the involvement of the pyramidal tracts in the spinal cord, as indicated invariably by an extensor plantar response. Calf-tenderness and " burning feet " were present in many cases and often loss of vibration sense. But paralysis was the characteristic and predominant

manifestation of the disease. In no case was there any evidence of a specific infectious process or local vascular disease or neoplasm to account for the condition. The designation "nutritional paraplegia" is admittedly *faute de mieux*. The great majority of patients indeed came from the poorer classes and subsisted on diets which were far from ideal and often limited to whole meal bread and dates. Most showed a very slow improvement in hospital following treatment with liver extract and the vitamin B complex. There were no signs of known dietary deficiency diseases. The authors do not discuss the possibility of toxins in the food being, at least, partially responsible.

[Clearly these cases of paraplegia in Baghdad present an interesting clinical picture and a difficult aetiological problem. It is to be hoped that the authors will continue the study. Detailed records of the patients' normal diet would clearly be interesting: so also would some pathological information, should the opportunity arise.] *R. Passmore*

MUNSELL, Hazel E., WILLIAMS, L. O., GUILD, Louise P., TROESCHER, Cynthia B., NIGHTINGALE, Gertrude & HARRIS, R. S. Composición de las plantas alimenticias de la América Central. III. Guatemala. [**Composition of Nutritious Plants of Central America. III. Guatemala.**] *Bol. Oficina Sanitaria Panamericana.* 1951, Apr., v. 30, No. 4, 474–93.

HAEMATOLOGY

LANGUILLON, J. Recherches sur la répartition des groupes sanguins chez les guadeloupéens de race noire. [**Distribution of Blood Groups in the Dark-Skinned Inhabitants of Guadeloupe.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 181–4, 1 graph.

The following is a translation of the author's summary :—

We have studied the distribution of the blood groups among 2,000 people in Guadeloupe, of whom 1,000 showed signs of cross breeding. In both cases the formula was O>A>B. On the other hand, although the biochemical index [Hirszfeld] of the cross-bred Guadeloupians (1·61) approached that of the people of Martinique (1·41) and of Guiana (1·77), that of the dark-skinned Guadeloupians was only 1·27. This lowering of the index is accounted for by the excess in the number of B groups relative to A groups.

H. J. O'D. Burke-Gaffney

ESPINOSA, J. A. Hemograma del habitante de Trinidad (Departamento del Beni, Bolivia). [**Haemogram of Inhabitants of Trinidad (Bolivia).**] *An. Laboratorio Central.* Cochabamba, Bolivia. 1951, Jan., v. 3, 12–19, 4 charts. [10 refs.]

JALILI, M. A., NAKKASH, B. Y. & TAJ-EL-DIN, H. M. **Liver Function Tests and other Biochemical Studies on Anaemia.** *J. Faculty of Med., Baghdad, Iraq.* 1950, Jan.–Mar., v. 14, Nos. 1/2, 1–24, 1 fig. [43 refs.]

As normal values for Iraqis are not available, the serum proteins, serum albumin, albumin/globulin ratio, serum bilirubin, alkaline phosphatase, blood glucose, blood urea, and blood cholestrol were estimated in 13 healthy Iraqi males and 4 females, and were found to correspond very closely with those of normal Europeans.

Thirty-nine cases of severe anaemia with haemoglobin below 7 gm. per 100 ml. were also investigated. Of these, 23 patients were said to have ancylostome anaemia [actually, they had ancylostome ova in their stools and anaemia] of which 13 had liver enlargement. Of the latter, 5 had slight hypo-proteinaemia, 8 had inverted albumin/globulin ratios, and one showed neither change. Of the remaining 10 cases without liver enlargement 3 showed hypo-proteinaemia, 3 inverted ratio, and 4 showed neither change.

Six patients had chronic malarial anaemia and all had liver enlargement and all but one had positive liver dysfunction tests. Of these, 2 had hypo-proteinaemia and 4 inverted ratio.

Fifteen patients of the 39 had oedema. Of these, 5 had hypo-proteinaemia and 10 had an inverted ratio, and one had both, that is, all but one had an albumin deficiency, but the critical level at which oedema occurred could not be determined.

After suitable treatment the total protein increased in 75 per cent. and the ratio improved in 60 per cent. *L. E. Napier*

DE MURO, P. & LEONARDI, G. **Hemopathic Mediterranean Syndrome.** *Acta Med. Scandinavica.* 1950, Oct. 10, v. 138, No. 5, 362–75, 6 figs. [33 refs.]

The authors begin this paper with a well-annotated discussion on the literary evolution of this syndrome from the early papers by RIETTI, GREPPI and MICHELI, in 1925, 1928 and 1929, respectively, to CHINI's (1948) classification, which is as follows :—

I. Simple haematological disorder (Mediterranean disorder of Wintrobe).
II. Haematological disorder with anaemia (Target-oval cell anaemia of Dameshek).
III. Haematological disorder with anaemia and haemolytic icterus (Rietti–Greppi–Micheli syndrome).
IV. Haematological disorder with more-or-less severe anaemia and slight jaundice with normal or decreased urobilinogen in the faeces.

The essential feature is an hereditary abnormality of the red cells which this syndrome shares with Cooley's anaemia : when this trait is inherited from one parent, one of these milder forms occurs, but when from both the more severe Cooley's anaemia results.

It is suggested that the trait is dependent on an " evolutive mesenchymal defect ", an inherited inability to synthesize sufficient haemoglobin, probably on account of an inability to utilize iron.

The authors suggest that malaria has played a part in the evolution of this syndrome.

Two cases are reported in detail :

Case I. Both parents showed macrocytosis and increased corpuscular resistance ; the siblings showed varying degrees of anaemia and two had died with anaemia and splenomegaly.

The patient, a boy of 14 years, gave history of splenomegaly with periodic attacks of fever from the age of 6. His physical development was retarded ; he had Mongolian facial appearance, hypogonadism, hepato- and splenomegaly, irregular fever, slight jaundice, and X-ray changes in the skull.

He had a severe chronic anaemia, macrocytic and hyperchromic, increased corpuscular resistance, anisocytosis, poikilocytosis, and fragmentation of the red cells. There were no primitive cells in the peripheral blood but a few macroblasts and megaloblasts in the marrow. There was no clinical or haematological response to iron, liver extract, folic acid, vitamin B complex, or blood transfusion.

Case II. The parents and siblings similarly had varying degrees and types of blood dyscrasia and all the brothers and the patient showed marked physical retardation suggesting pituitary dwarfism.

The clinical and blood pictures were very similar to the first case, except that the anaemia was microcytic, there were target cells and a few ovalocytes, and there were no radiological changes in the bones.

There was also no response to therapy.

The former case is considered to be a characteristic example of the Rietti-Greppi-Micheli syndrome with macrocytic anaemia or thalassaemia minor, and the second to be very close to it ; both are classed as examples of the haemopathic Mediterranean syndrome. *L. E. Napier*

FAHMY, T. & KINAWY, M. **Three Cases of Thalassaemia occurring in One Family.** *J. Roy. Egyptian Med. Ass.* 1951, v. 34, No. 2, 133–8.

BARNARD, R. D. **Terramycin Therapy in Thalassemia. The Response of a Patient with Cooley's Anemia to Sustained Small Doses of Terramycin Base.** *Med. Times.* New York. 1951, Apr., v. 79, No. 4, 218–21. [11 refs.]

"A patient with Cooley's anemia made a favorable general and hematologic response shortly after inception of small doses of terramycin base used as a dietary supplement. The response was similar to that seen from this mode of therapy in other varieties of erythroblastic arrest anemias."

SHOTTON, D., CROCKETT, C. L., Jr. & LEAVELL, B. S. **Splenectomy in Sickle Cell Anemia : Report of a Case and Review of the Literature.** *Blood.* 1951, Apr., v. 6, No. 4, 365–71, 1 fig. [23 refs.]

"1. A case of sickle cell anemia who had numerous hemolytic crises and also hypersplenic effects such as pancytopenia was treated by splenectomy with marked improvement in general condition and in the blood. The literature relating to this subject is reviewed. Those cases with the largest spleens appear to have shown the most striking degrees of improvement.

"2. In cases of sickle cell anemia showing various indications of hypersplenism, and excessive hemolysis, splenectomy may be a rational therapeutic procedure."

DERMATOLOGY AND FUNGUS DISEASES

NUÑEZ ANDRADE, R. Enfermedad de Nuñez Andrade. [**Nuñez Andrade's Disease.**] *Medicina.* Mexico. 1951, Feb. 25, v. 31, No. 622, 63–75, 13 figs.

Nuñez Andrade's disease is a parasitic dermatitis resulting from bites by the larva of *Neoschoengastia nuñezi* and characterized by generalized polymorphic molluscoid lesions accompanied by intense pruritus and, unless secondary infection occurs, undergoing evolution in one to four weeks. The insect is described in detail and illustrated by line drawings ; it is from 0·33 to 0·45 mm. in length and is a common parasite of fowls.

Children are mostly attacked, but adults do not escape ; six cases in one family are referred to in this communication : a little girl of 3 years with very many lesions, her two brothers, aged 6 and 8 years, her parents and her maternal grandmother.

Lesions occur chiefly on the hairy scalp, the neck, behind the ears and on the shoulders and upper part of the trunk, but they may be seen on any part of the body. The lesion shows first as a petechia, then a papule and vesicle, later drying to a molluscoid appearance, 2–5 mm. in diameter, reddish in colour and umbilicated ; they may be very numerous ; the corresponding lymphatic glands are swollen and painful ; pruritus is intense. Scratching may lead to secondary infection with production of abscesses which prolong recovery. Treatment by benzyl benzoate and ointments of this nature give most relief and for prophylactic purposes the use of dimethyl phthalate or sulphur and talc, and free use of DDT in the fowl-runs. The paper is illustrated by photographs of children showing the lesions. *H. Harold Scott*

BÖE, J., LINDÉN, V. & TVEIT, J. **Histoplasmin and Coccidioidin Sensitivity in Norway.** *Acta Med. Scandinavica.* 1951, Mar. 17, v. 139, No. 3, 196–202, 1 fig. [14 refs.]

In a report by KELLY & WOODRUFF [this *Bulletin*, 1950, v. 47, 659] on the results of the histoplasmin test in Detroit, the reactor rate was as high as 25 per cent. among immigrants from Poland, Rumania and Jugoslavia, and only 10 per cent. in people born in Detroit. The present authors therefore decided to conduct a survey in Norway based on the histoplasmin, coccidioidin and tuberculin skin tests. In all, 1,074 persons were tested, this number being made up of 935 hospital patients and 139 hospital staff and students, or, by sex, 616 males and 458 females.

Histoplasmin for the test was used at a dilution of 1 : 100 but the minimum reaction accepted as positive was an area of induration 10 mm. across, in place of the 5 mm. reaction accepted as positive in America. The results of the tests in the various age-groups are set out in this table :—

Ages	Total persons	Histoplasmin positive per cent.	Coccidioidin positive per cent.	Tuberculin positive per cent.
10–19 years ...	53	2·0	0·0	40·0
20–29 ,, ...	231	2·2	1·3	70·0
30–39 ,, ...	173	7·5	3·0	77·0
40–49 ,, ...	185	8·6	4·3	81·0
50–59 ,, ...	197	6·0	3·3	85·0
60–69 ,, ...	143	2·1	2·1	74·0
70 and over ...	92	0	0	67·0

An analysis of the results showed that reactors to histoplasmin alone numbered 27 (2·5 per cent.) and to both histoplasmin and coccidioidin 23 (2·2 per cent.) giving a total of 50 reactors to histoplasmin. Reactors to coccidioidin alone numbered 3 (0·3 per cent.) and to both coccidioidin and histoplasmin 23 (2·2 per cent.) making a total of 26 reactors to coccidioidin. None of the 53 reactors showed any sign of [active ?] pulmonary disease or of any other condition which could be attributed to fungal infection. Only the three people who were sensitive to a fungal antigen and not to tuberculin showed no pulmonary calcifications. Of the 3 reactors to coccidioidin alone, one had lived in California, but in all other cases the reaction to this test was regarded as not specific.

The authors consider that the histoplasmin reaction indicates some kind of fungus infection, past or present, and they add that "at any rate, some of the positive cutaneous reactions to histoplasmin demonstrated in our series really imply past or present infection with *Histoplasma capsulatum*".

J. T. Duncan

BURKE, Ruth C. *In Vitro* **Cultivation of the Parasitic Phase of** *Coccidioides immitis*. *Proc. Soc. Exper. Biol. & Med.* 1951, Feb., v. 76, No. 2, 332–5, 8 figs.

A sporangial body of *Coccidioides immitis*, resembling the parasitic form of the fungus, was cultivated *in vitro* as far back as 1914, by sowing pus containing the parasitic sporangia in ascitic fluid. Since that time sporangia have been developed in culture from sowings of the saprophytic chlamydospores, but only from a proportion of the strains used. In the present study a culture medium was devised on which all of 7 strains of *C. immitis*, including one which was ten years old, bore sporangia from sowings of mycelium or chlamydospores.

The composition of the culture medium was as follows : coconut milk 250 ml., Knop solution diluted 1 : 2, 500 ml., distilled water 250 ml., Berthelot solution of trace elements 10 drops, dextrose 3 per cent., washed agar 1 per cent., cysteine 10^{-6}, thiamine 10^{-5} and naphthaline acetic acid 10^{-7}. The coconut milk was sterilized by filtration and added to the other ingredients which had previously been sterilized in the autoclave.

Sowings of mycelium and chlamydospores were made on the surface of the medium in tubes or flasks and incubated at 37°C. or at room temperature. Vegetation was evident in 2 or 3 days and the aerial mycelium was suppressed by folding over the colony. The sporangia, which were terminal or intercalary, were found at times as early as the 11th day, but usually they did not appear until much later ; as late as the 10th week in some cultures. The temperature of incubation had no observed effect on the rapidity of development of the sporangia. All stages in the evolution of the sporangium and its endospores were observed in the cultures. The thin-walled newly liberated endospore sometimes enlarged to form a fertile sporangium as in parasitic life, but at other times it germinated and gave rise to a mycelium which, in turn, bore sporangia. *J. T. Duncan*

WINN, W. A. **Pulmonary Mycoses—Coccidioidomycosis and Pulmonary Cavitation. A Study of Ninety-Two Cases.** *Arch. Intern. Med.* 1951, Apr., v. 87, No. 4, 541–9, 10 figs. [Refs. in footnotes.]

In pulmonary mycoses the lesions tend to become organized and to persist. This is particularly true in the case of coccidioidomycosis in which the pulmonary residua may consist of single or multiple solid foci, coccidioma, cavitation, persistent hilar adenopathy, calcification and less frequently bronchiectasis and fibrosis. The residual pulmonary cavity of coccidioidomycosis ranged in diameter from 1·0 to 14·0 cm. and caused haemoptysis in 65 per cent. of the observed cases ; otherwise the associated signs and symptoms were trivial.

In a group of 92 patients with persistent pulmonary cavitation, the cavities, in 25 per cent., closed spontaneously after some months or years. In 10 per cent. the cavity persisted for a number of years without causing evident harm ; in 6 per cent. it filled and formed a chronic nodule resembling a neoplasm, and in 2 per cent. it ruptured into the pleura, causing pneumothorax with or without empyema.

In about one-third of the cases, excessive bleeding or extension of the cavity demanded closure by simple collapse treatment, supplemented or not by pneumoclasia or pneumonolysis (in 8 cases). Collapse treatment was successful in 18 cases but failed in 10. Treatment by surgical excision has been applied in some of the smaller cavities, but segmental lobar resection, lobectomy or even pneumonectomy may be necessary for the larger cavities. These measures were employed with success in 14 cases.

Never has the author observed fatal dissemination of the disease from a residual pulmonary cavity, so this possibility, of itself, is not a justification for drastic surgical treatment.

Coccidioidomycosis is not transmitted directly from man to man and there is no evidence that patients with persistent pulmonary cavities are a menace to their contacts. *J. T. Duncan*

DICK, A. M. **Nasal Rhinosporidiosis. Report of a Case in Natal.** *South African Med. J.* 1951, Apr. 21, v. 25, No. 16, 270–71, 1 fig.

MELENEY, F. L. & JOHNSON, B. A. **Supplementary Report on the Case of Chronic Ulceration of the Foot due to a New Pathogenic Mycobacterium (MacCallum).** *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1499–503.

TROPICAL OPHTHALMOLOGY

MAO, W. S. **Cataract in Szechuan.** *Chinese Med. J.* Shanghai. 1950, May–June, v. 68, Nos. 5/6, 159–63.

Few studies have been made on the prevalence of cataract in China. PI, in 1934, analysed the incidence of cataract in 295 cases in the northern part of China. CHANG, in 1940, analysed the incidence of cataract in 125 cases in the western part of China. The present author, working in the western area of China, analysed 354 cases of cataract out of 6,233 in-patients. These consisted of 157 cases of senile cataract, 79 complicated cataract, 57 traumatic, 17 presenile, 11 juvenile, 21 congenital, 3 "snow" cataract, and 9 unclassified. Of the senile cataracts, 89 were in males and 68 in females. Among the complicated cataracts, iridocyclitis was the most frequent cause. The 3 cases of "snow" cataract occurred in patients who gave a history of having travelled in the snow mountains in and near Szechuan: the aetiology of this the author is at a loss to explain. *E. O'G. Kirwan*

SARKIES, J. W. R. **Some Observations on the Eyes of African Villagers.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Apr., v. 44, No. 5, 608–9.

The writer of this letter, from Accra, refers to the report by COLBOURNE *et al.* [this *Bulletin*, 1951, v. 48, 685] on a survey at Kwansakrom, Gold Coast. He himself has recently examined the eyes of 127 of the inhabitants of the same village. He had not suitable opportunities to record visual acuity, but two of three persons said by the headman to be blind were examined: they were elderly women with early lens sclerosis who could get about unaided and whose vision could be corrected to 6/12.

Trachoma was found in 14 per cent. of those examined. It was always mild (stage I or II) but some degree of pannus was present in all. The author regards the figure as a high one for forest inhabitants and compares it with the incidence in a boys' industrial school half a mile from Kwansakrom, where it was 3 per cent. of 122 boys examined. These boys came from a wide area of the Gold Coast.

He was interested to find out whether microfilaria of *Dipetalonema streptocerca* invaded the eye as *Onchocerca volvulus* does. In view of the figures for infestation with streptocerciasis in the village noted by Colbourne *et al.* [49 positive skin smears from 234 people] it is significant that no microfilariae of any kind were found in the eyes of the limited number of persons examined for them by

the present author. Also, he examined 29 patients with a diagnosis of streptocerciasis which had been confirmed by skin smears. Examination by ophthalmoscopy and by slit lamp microscopy failed to reveal any microfilariae in the anterior chamber of the eye. Seventeen of the patients specially examined had negative conjunctival snips.

The author concludes that the evidence is thus fairly strong that " invasion of the eye by embryos of *D. streptocerca* is rare—if indeed it occurs at all ".

H. J. O'D. Burke-Gaffney

FUCHS, A. **The Early Diagnosis of Trachoma.** *U.S. Armed Forces Med. J.* 1950, Oct., v. 1, No. 10, 1171–7.

The early signs of trachoma are characterized by the typical nodules in the retrotarsal fold and the hypertrophy of the tarsal conjunctiva which obscures the tarsal vessels. Later the conjunctiva of the retrotarsal fold becomes opaque, obscuring the conjunctival vessels. If in these cases a pannus is seen, there can be no doubt about the diagnosis. This can also be ascertained by a smear of the conjunctival epithelium as inclusion bodies can nearly always be found in early cases. The inclusion bodies appear blue when stained with Giemsa stain and are usually situated as a mass, shaped like a small skull cap, close to the nucleus. Acidophilic elementary bodies and basophilic initial bodies may be found. At the end of the second and the beginning of the third stage of trachoma, scars make their appearance, especially in the upper tarsus. They usually follow the sulcus subtarsalis and form whitish lines parallel to the free margin of the eyelid. These scars remain permanently and reveal the former existence of trachoma. The scars are so located because here the vessels and nerves perforate the tarsus connecting the conjunctiva with the tissue in front of the tarsus. Thus the tissue in front of the tarsus and Mueller's muscle may be infiltrated, causing the lid to become heavy and the characteristic ptosis to develop. In China, trachoma is much less severe than in Europe or the Near East. A flame-shaped scar extending from the retrotarsal fold into the upper tarsal conjunctiva occurs more frequently than the horizontal scars commonly seen in Europe.

The author points out that children with nodules in a normal tarsal conjunctiva are not necessarily suffering from trachoma. Bacteriological examination and the treatment should help to solve this problem. If treatment causes these particles to disappear in 4 to 6 weeks, true trachoma was not present.

E. O'G. Kirwan

FREYCHE, M. J. **Antibiotics and Sulfonamides in the Treatment of Trachoma.** *Bull. World Health Organization.* Geneva. 1950, v. 2, No. 4, 523–44. [194 refs.]

The author reviews the successes and failures of the sulphonamides and antibiotics in the treatment of trachoma. In sulphonamide therapy, as pointed out by NATAF, " we have not yet found the specific treatment for this disease, but we have a tried and tested treatment giving a very large proportion of cures and always, or nearly always, bringing about an appreciable improvement ". Penicillin is undoubtedly a drug the value of which as an auxiliary in the control of trachoma is now undisputed, but it does not constitute in itself a solution to the problem of trachoma. Likewise, tyrothricin may be regarded not as a specific agent but as a good auxiliary antiseptic.

Streptomycin is a therapeutic agent of secondary value only in trachoma ; bacitracin is a remarkable contact antibiotic, is well tolerated by the conjunctival sac and would be worth trying in the treatment of trachoma. So far this has not yet been done.

Aureomycin and chloromycetin on both theoretical and practical grounds may constitute the specific therapeutic agent or agents for this disease.

The author stresses the paramount importance of methodical and sufficiently widespread experimental trials which should be carried out in several countries.

E. O'G. Kirwan

PIJOAN, M. J., PAYNE, E. H. & DINEEN, J. **Progress in the Treatment of Trachoma with Chloromycetin (Chloramphenicol).** *Amer. J. Trop. Med.* 1950, Sept., v. 30, No. 5, 677–80. [16 refs.]

A group of 14 patients comprising 8 children and 6 adults suffering from trachoma were treated by the authors with large doses of chloromycetin (chloramphenicol) administered orally.

All the subjects exhibited corneal activity as evidenced by pannus, fluorescein staining punctate lesions, follicles on the upper tarsal conjunctivae and complained of photophobia and lacrimation.

The dose for children was 1·5 gm. daily in divided doses at 3-hour intervals for 3 to 4 days. The dose for adults was 3 gm. in the first 24 hours in divided doses at 3-hour intervals followed by 1·5 gm. daily for 3–4 days.

Treatment resulted in a marked amelioration of the disease and reduction in the inflammation processes. The patients were observed for 3 months without evidence of relapse.

E. O'G. Kirwan

SOPER, F. L. Control de las infecciones oculares en el continente. [**Control of Eye Diseases on the Continent (of America).**] *Bol. Oficina Sanitaria Panamericana.* 1951, Apr., v. 30, No. 4, 457–70, 1 map. [36 refs.]

The author disarms criticism by stating at the outset that ophthalmology is not a speciality of his, hence the figures he presents are based on the records of others. He lays special stress on onchocerciasis. In this respect reports from Venezuela afford a contrast. In 1949 Pablo ANDUZE could not find a single case of blindness due to onchocerciasis in Venezuela and, from observation of 800 persons, 300 of whom were infested, he concluded that the disease in Venezuela was of a very mild character.

Statistics of blind persons obtained in previous censuses gave, per 100,000 inhabitants, 146·7 in Brazil, 144·5 in Peru, 123·5 in Venezuela (these are on the 1940 census), 114·1 in Mexico and 108·1 in Honduras (these are on the 1935 census). According to a 1940 census the following had less than 100 : Cuba 95·9, Canada 86·6, Uruguay 80·7, Guatemala 71·7 and Panama 64·7. The United States in a 1930 census had 51·8 per 100,000, but in 1947 the figure of 175 was returned, a more than threefold increase. The author observes that the numbers are not entirely trustworthy because of the difficulty of interpreting what exactly is meant by " blindness " and the same definition is not used by all.

Generally speaking, the chief causes in many countries are gonorrhoea (especially ophthalmia neonatorum), trachoma, syphilis and glaucoma. In Colombia the following causes are stated in percentages : purulent ophthalmia 42, cataract of one form or another 22, atrophy of the optic nerve 14, adherent leucoma 6, buphthalmos 6, trauma 6, pathological dislocation of the lens, 4. These are recordings from the Blind, Deaf and Dumb Hospital, but taking into account the entire population, adults as well as young, ophthalmia neonatorum is given as 40 per cent., glaucoma 20, " ocular atrophy " 10, cataract 10, gonococcal conjunctivitis among adults 5, accidents and rare conditions 15 per cent. In Mexico and Guatemala common causes are ophthalmia neonatorum, the eruptive fevers and syphilis, but in these countries onchocerciasis is an

important aetiological factor. Cases, treated and untreated, in Mexico are said to number [in 1943 ?] 23,205 among 35,000 with reduced vision, or 102 per 100,000 inhabitants. In Guatemala ocular complications of onchocerciasis reach the high figure of 471 per 100,000.

In appendices are presented tables showing (i) morbidity of certain transmissible diseases—smallpox, gonorrhoea and trachoma—in the American republics and Canada ; (ii) a summary of the laws and regulations to prevent neonatal ophthalmia in the United States since January 1st, 1949, and (iii) a list of articles dealing with eye affections and blindness in the Western Hemisphere, published between 1946 and 1948. *H. Harold Scott*

See also p. 744, BADIR, **Schistosomiasis of the Conjunctiva.**

MISCELLANEOUS DISEASES

WESTWOOD, L. A. & LEVIN, S. **The Eosinophilic Lung.** *Tubercle.* 1951, May, v. 32, No. 5, 98–107. [74 refs.]

" (1) The literature on Löffler's syndrome, tropical eosinophilia and related subjects is reviewed. It would appear that many diseases manifesting eosinophilia and transitory lung changes are related, and form narrow bands on a broad spectrum with asymptomatic Löffler's syndrome at one end, and deadly periarteritis nodosa at the other.

" (2) Over a three-year period, 24 cases of 'the eosinophilic lung,' have been studied at the Coronation Hospital and 3 of these are reported. Although no cause was found in our series, ascariasis was the most common association."

FAIN, A. Tumeurs néoplasiques bénignes et malignes chez le noir de race Bahutu au Ruanda-Urundi. [**Benign and Malignant Tumours in Africans of the Bahutu Tribe in Ruanda-Urundi.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1477–81.

The following is a translation of the author's summary :—

Of 90 neoplasms diagnosed among Africans of the Bahutu Tribe in Ruanda Urundi, 49 were malignant and comprised 21 epitheliomata, 15 sarcomata, 7 malignant melanomata, 1 Hodgkin's lymphadenoma, 3 mixed tumours and 2 Wilms tumours [complex renal embryonic tumour].

One case of epithelioma of the prostate was diagnosed and is believed to be the first so diagnosed in the Belgian Congo and probably in Central Africa.

H. J. O'D. Burke-Gaffney

ENTOMOLOGY AND INSECTICIDES : GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

CHOW, C. Y., HUANG, T. C. & YUE, T. F. **Bibliography of Chinese Arthropods of Medical and Veterinary Importance.** Reprinted from *Quart. J. Taiwan Museum.* 1950, v. 3, No. 3, 152–85.

The authors of this Bibliography write from, respectively, the Department of Zoology, National Taiwan University, the Laboratory of Medical Entomology, National Institute of Health and the Taiwan Museum.

They point out that existing bibliographies relating to Chinese arthropods of medical and veterinary importance are incomplete and the object of the

present work is to bring the information up to date in the interests of taxonomists and public health workers alike.

The bibliography was compiled from literature published from 1828 up to the end of 1949. It opens with a general section and then gives a bibliography relating separate headings to (A) Insecta and (B) Arachnida. These are subdivided into (A) mosquitoes, sandflies, biting midges, horse flies (all related to the diseases carried by them in China) and flies—" carriers of pathogenic bacteria, parasitic cysts, and ova : Myiasis ".

This section also includes fleas, lice and " assassin and bed bugs ". (B) covers ticks and mites, in relation to relapsing fever and typhus.

As little work has been done in China on Myriapoda, Crustacea, Coleoptera and Odonata, they are not included in the bibliography.

The bibliography covers 28 pages and as the titles of publications are given in full and are almost entirely in English, the work should be of great value to those interested in arthropods in China and their relation to disease.

H. J. O'D. Burke-Gaffney

WOKE, P. A. **A Rabbit-Ear Cage for Bloodsucking Arthropods.** *Pub. Health Rep.* Wash. 1951, Apr. 13, v. 66, No. 15, 464–71, 2 figs.

A full description is given of the construction and use of a cage designed for attachment to the heads of rabbits, so as to enclose the ears, and providing for the continuous feeding of blood-sucking arthropods. It consists, in essentials, of transparent celluloid, bent and cemented into the shape of a frustrum of a cone, the narrow end sealed with a cloth border and collodion to the head of the rabbit, surrounding the bases of the ears (the hair being clipped short). The wide end extends just beyond the tips of the ears, and is closed with bolting silk attached with adhesive tape. Any openings required for ventilation are closed with bolting silk or wire gauze, secured with an acetone solution of celluloid. Bolting silk in the latter situation is backed by 18-mesh wire gauze to act as a support. For bed bugs, lice and some mites, harbourages made from corrugated paper may be attached to the wall just inside the top opening.

This cage has been in successful use for over two years, and has advantages in increasing the chances of feeding taking place, improving observation of feeding, reducing the possibility of escape or ingestion by the host, and facilitating the collection of the eggs and faeces of the arthropods under test. Furthermore, litter and droppings of the rabbit may be tested for the presence of pathogens without contamination by the arthropod vector.

It is possible in practice to control the atmospheric conditions within the cage and to introduce gaseous stimulants or anaesthetics as required. The cages appear to cause little discomfort, and the rabbits require no special treatment.

A. J. P. Goodchild

VINCKE, I. H. & LELEUP, N. Notes éthologiques et biologiques sur *Anopheles argenteolobatus* Gough. [**Notes on the Characteristics and Biology of** *Anopheles argenteolobatus*.] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1601–3.

VAN SOMEREN, E. C. C. **New Culicini from Kenya and Uganda.** *Proc. Roy. Entom. Soc. of London.* Ser. B. 1951, Feb. 20, v. 20, Pts. 1/2, 1–9, 7 figs.

" 1. *Aëdes* (*Stegomyia*) *heischi* from Kenya, *Culex* (*Culiciomyia*) *mongiro*, *C.* (*C.*) *pseudopruina*, *C.* (*Neoculex*) *kanyamwerima*, *C.* (*N.*) *kilara* and *Uranotaenia yovani* from Uganda are described as new.

" 2. Notes are given on *Uranotaenia ornata* var. *musarum* Edwards and on its larva, and the pupa is described for the first time."

MATTINGLY, P. F. *Culex* (*Culex*) *nakuruensis* **sp. n. (Diptera, Culicidae), a Remarkable New Mosquito from the East African Highlands.** *Proc. Roy. Entom. Soc. of London.* Ser. B. 1951, Apr. 16, v. 20, Pts. 3/4, 44–6, 1 fig.

ZUMPT, F. **Myiasis in Man and Animals in Africa.** *South African J. Clin. Sci.* Cape Town (incorporating *Clin. Proc.*). 1951, Mar., v. 2, No. 1, 38–69, 4 pls. [Numerous refs.]

In this paper, which cannot readily be summarized, the classification of myiasis is based on the clinical symptoms as follows : traumatic myiasis, attacks of blood-sucking larvae, dermal and sub-dermal myiasis, myiasis of the head cavities (including the eyes), enteric myiasis and myiasis of the urogenital system.

Many of the records mentioned under these headings are based on specimens which have been sent to the South African Institute for Medical Research by medical men and health officials in the Union, other records are from the literature, especially those of myiasis in parts of Africa outside the Union. All are included in a table occupying eleven pages, giving the names of over 80 species of fly, the type of myiasis caused by their larvae, also their world distribution and African records. The titles of about 100 published works are appended. *H. S. Leeson*

PARROT, L. Notes sur les Phlébotomes. LXI. A propos de classification. [**Notes on** *Phlebotomus*. **LXI. Classification.**] *Arch. Inst. Pasteur d'Algérie.* 1951, Mar., v. 29, No. 1, 28–45. [33 refs.]

A highly technical review of the subgenera and other units into which authors have divided *Phlebotomus* in the wide sense ; the taxonomic questions require fuller knowledge of non-bloodsucking Psychodidae, and of American *Phlebotomus*. *P. A. Buxton*

GRENIER, P. & OVAZZA, M. Simulies du Moyen Congo. [**Species of** *Simulium* **in the Middle Congo.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 222–34, 5 figs. [11 refs.]

The authors give a detailed description of the larva of *Simulium damnosum* with figures. The surface of all parts of the thorax, pseudopodia and abdomen is covered with numerous spatulate scales, of different sizes. Abdominal segments 1–6 each carry a pair of conical tubercles, which are almost black owing to a particularly dense vestiture of scales. The head is entirely brown, the ventral excision of capsule unusually wide. The antenna is short, of three segments, the first and third equal in length, the second twice as long. The premandible (" brush ") has about 40 large sickle-shaped bristles. The submentum has nine teeth. The rectal gills are much branched, with about 35–38 secondary branches. The authors' experience is that *S. damnosum*, though well known to occur in torrents, may breed in rather slowly running water, with such species as *S. adersi*. They note that LEWIS has had similar experience in the Anglo-Egyptian Sudan : *damnosum* is not by any means confined to water in rapid movement.

The paper contains anatomical notes, figures and locality records on five other species, of which two are new. *P. A. Buxton*

ELBEL, R. E. **Comparative Studies on the Larvae of certain Species of Fleas (Siphonaptera).** *J. Parasitology.* 1951, Apr., v. 37, No. 2, 119–28, 22 figs. on 3 pls.

SCHOENAERS, F. Présence au Katanga d'*Ornithodorus megnini* (Dugès, 1883). [**Presence of** *Ornithodorus megnini* **in Katanga.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1541–3.

ANDRÉ, M. Deux nouvelles espèces de *Trombicula* d'Afrique Équatoriale. [**Two New Species of** *Trombicula* **in French Equatorial Africa.**] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 3/4, 215–21, 2 figs.

In this and a previous paper the author describes larvae of three *Trombicula* species from Oubangui Chari, French Equatorial Africa. Larvae of all three occur on wild rodents, and one also on chicks (*Gallus domesticus*).

We know nothing to support the suggestion that any of these mites " could be considered as vectors of a type of typhus resembling scrub typhus ". The work of the last few years has shown that very many species, even in S.E. Asia, have no relation to rickettsial diseases. We think that the absence of any mite-borne typhus is characteristic of Africa. *P. A. Buxton*

DESCHIENS, R. L'acariase de l'appareil respiratoire chez les primates et chez l'homme. [**Acariasis of the Respiratory Tract in Primates and in Man.**] *Ann. Inst. Pasteur.* 1951, Feb., v. 80, No. 2, 107–47, 15 text figs. & 4 figs. on 2 pls. [40 refs.]

The author describes pulmonary infestations of rabbits and monkeys with species of the mite *Pneumonyssus*. The remainder of the paper is taken up by an account of pulmonary acariasis of man, due to Tyroglyphids for the most part, and its relation to tropical eosinophilia. *J. H. Sudd*

TEOTIA, T. P. S. & DAHM, P. A. **The Effect of Temperature, Humidity, and Weathering on the Residual Toxicities to the House Fly of Five Organic Insecticides.** *J. Econom. Entom.* 1950, Dec., v. 43, No. 6, 864–76, 8 figs. [22 refs.]

Three experiments were conducted to determine the average median lethal dose, the effect of weathering on residual toxicity and the effect of temperature and humidity on residual toxicity of the five insecticides aldrin, dieldrin, chlordan, parathion and lindane.

Mortality of flies exposed to residual deposits from benzene solution showed the order of toxicity as based on median lethal dose to be : dieldrin, aldrin, lindane, parathion and chlordan, the last being much less toxic than the others. Test panels of painted, unpainted and whitewashed plywood, treated with both commercial and laboratory concentrates, were exposed to the weather and tested at intervals up to 45 days. After this time dieldrin gave 50 per cent. mortality on unpainted, and 45 per cent. on painted and whitewashed panels, while all the others gave insignificant kills. Highest residual toxicity was on unpainted panels in each case. Chlordan, lindane and parathion showed a more rapid loss of residual toxicity on whitewashed than on painted panels. The laboratory emulsions, although having a lower initial toxicity on all three types of surface, declined more gradually than the commercial emulsions. The order of persistence was dieldrin, aldrin, parathion, chlordan and lindane. Glass panels prepared similarly were kept in control cabinets under the following conditions : 108°±2°F. and 36±5 per cent. R.H., 82°±2°F. and 58±5 per cent. R.H., 52°±2°F. and 76±5 per cent. R.H. These were tested at intervals of up to 65 days. The initial toxicity of all substances on glass was high. Both 12 hours and 2 days after treatment parathion and lindane gave the most rapid knock down and chlordane the slowest. High temperatures and low relative humidity caused the most rapid decline in toxicity, dieldrin

and parathion persisting for 16 days and the others only for 4 days. Dieldrin and parathion gave 100 per cent. kill after 65 days at low temperatures and high relative humidity, the others declining after 28 days. Laboratory emulsions had a slightly extended residual toxicity. *Ruth Nash*

BOVINGDON, H. H. S. **Persistence of Benzene Hexachloride as an Insecticide on Lime-washed Surfaces.** [Correspondence.] *Nature.* 1951, May 5, 734.

Benzene hexachloride (BHC) has not been recommended for use on lime-washed surfaces, because it decomposes on lime slurry ; but it does not decompose on chalk or ground limestone slurries. The author experimented to see whether exposure to air would eventually make a freshly lime-washed surface suitable for spraying.

Porous earthenware surfaces were whitewashed with slurries freshly prepared from quicklime or whiting, aired for 1, 7 and 14 days and sprayed with BHC dispersible powder to leave 7·4 mgm. *gamma* isomer /sq. ft. At intervals of 2, 3 and 4 weeks, *Sitophilus granarius* adults were exposed on the treated surfaces for two hours : they were then placed with wheat for mortality counts 4 days later.

The results, which are given in a table, indicate that the deposit on the lime-washed surface lost toxicity relative to that on the other surfaces only after two weeks when the airing period was one day. No relative loss was noted on any surface aired for longer periods.

Somewhat similar results, although with lower mortalities, were obtained with BHC in kerosene. In this case, however, differences tended to be masked owing to absorption by the earthenware of the oil solution.

The author concludes that BHC dispersible powder can be sprayed on surfaces seven days after lime-washing without loss of toxicity—an observation of practical importance. *H. J. O'D. Burke-Gaffney*

WEINER, R. & CROW, J. F. **The Resistance of DDT-resistant Drosophila to other Insecticides.** *Science.* 1951, Apr. 13, 403–4, 1 fig.

KETELAAR, J. A. A. & HELLINGMAN, J. E. **Chemical Studies on Insecticides. Determination of Parathion and Dimethylparathion.** *Analytical Chemistry.* 1951, Apr., v. 23, No. 4, 646–50, 2 figs.

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

MOUCHET, R. **The Foreami.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Apr., v. 44, No. 5, 483–92. Discussion 492–500 [CHESTERMAN, C. C. ; LEITCH, N. ; COLBOURNE, M. J. ; WILCOCKS, C. ; LEHMANN, H. ; LOURIE, E. M. ; PEARSON, F. A. ; SELWYN-CLARKE, S. ; MACDONALD, G. (Chairman) ; MOUCHET (in reply).

The Belgian Colonial Medical Service early realized the very limited value of central hospitals in making any impact on rural health problems. The organization of ambulatory treatment for sleeping sickness led in 1924 to the establishment of rural dispensaries and the proper training of African Medical Assistants.

Financial and staffing difficulties precluded a total rural programme for the whole Colony, and in 1930 an autonomous body, the " *Fondes Reine Elizabeth*

pour l'Assistance Médicale aux Indigènes", (FOREAMI) was created. This body had a controlling committee both in Brussels and in the Congo and its objects were :—

To make and keep a general census of the population.
Periodical medical examination of every individual.
The methodical search for and investigation of endemic and epidemic diseases.
Hospital treatment for severe cases.
General sanitary supervision of villages and special measures where needed.
Social welfare of women and children.
Vital statistics.

Teams of doctors and other workers would take over a limited area and after some years hand over to the Colonial Service. They would use and subsidize existing official or voluntary hospital services.

A start was made in 1931 in the Lower Congo where communications were comparatively good. Hut-to-hut visitation was the rule and large registers were kept. Figures from 1931 to 1935 are given showing a definite regression in the incidence of sleeping sickness, yaws and smallpox, but not so clearly in leprosy, tuberculosis or syphilis.

In 1936 the units moved on to the adjoining Kwango area where the people were more primitive and less robust. The evidence of nutritional diseases was more obvious, including kwashiorkor, called locally *buaki*.

World War II seriously interrupted the programme, but colonial funds have now been added in order to maintain FOREAMI's work.

In the discussion which followed this paper, tribute was paid to the thorough and energetic effort at rural hygiene in which the FOREAMI acted as a kind of catalyst. Doubts were expressed as to the possibility of maintaining such intensity of survey and treatment, and of the value of mass attacks on any diseases other than the few which had shown a regression ; many others are not so susceptible to this method. The need for enlisting the cooperation of the people at village level was stressed.

Dr. Lehmann stated that kwashiorkor was properly a disease of early infancy and he illustrated this with slides and contrasted the condition with starvation syndromes seen in adult immigrants from Ruanda Urundi to Uganda.

References were made to the Nigerian Field Units and the East African Medical Survey, and to the need for a census of the people according to age-groups.

Professor Mouchet in reply stated that the Belgian Government intended to recruit 50 new doctors annually till a total of 600 was reached, and to increase the training of African Assistants of the lower and higher grades, in order to maintain the gains made by the successive operations of FOREAMI.

C. C. Chesterman

MARCHALANT, L. Les populations Yacouba—Toura—Ouobé dans la subdivision de Man (Côte d'Ivoire). Résultats d'une enquête démographique 1948–1949. [**Demographic Study of Tribes in the Man Area, Ivory Coast.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1950, v. 7, No. 2, 149–66, 2 maps.

MIETZSCH, F. Entwicklungslinien der Chemotherapie. (Vom chemischen Standpunkt gesehen.) [**Chemotherapeutic Trends from the Chemical Aspect.**] *Klin. Woch.* 1951, Feb. 15, v. 29, Nos. 7/8, 125–34, 22 figs.

The author briefly records some facts about chemotherapy from the time of Paracelsus in the Middle Ages, when metallic substances such as As, Sb, Bi,

etc., and their simple salts were used, till organic substances made their appearance about the time of Ehrlich. The dyestuffs industry played an important part in development with the production of triphenylmethane types (Tryparosan) and azo-colouring matters (Trypan red and blue). Organic arsenicals and the colourless Germanin (Bayer 205, Suramin) were developed later and the industry owed a great deal to the successful technical preparation of aniline as a starting material. Attention was directed to a wide range of substances which would attack all types of pathogenic organisms including viruses.

The author has chosen four classes of substances for discussion, namely, basic alkylated compounds, sulphonamides, thiosemicarbazones and antibiotics. Regarding the first-named group, various representatives are found in nature with basic group free or partly alkylated such as adrenaline, or with the basic group forming part of a ring structure as in morphine. From structures of this type novocaine and other local anaesthetics were developed. In the same class occur many antimalarials of the quinoline series such as plasmoquine [pamaquin], resochin [chloroquine], sontoquin, the pentaquines and others. In the acridine series atebrin [mepacrine] is the best known representative. The diguanide proguanil [paludrine] possessed a new type of structure. Derivatives of benzol such as Gavano were used in Germany as amoebicides. Xanthones (Miracil A) and thioxanthones (Miracil D) proved active in schistosomiasis. More recently analgesics and anti-histamine drugs of this type have been prepared and have led to the solution of many pharmacological and chemotherapeutic problems.

The development of sulphonamides has been traced to the study of substances of the above type and to certain azo-colouring matters such as chrysoidin and pyridium which were first shown to have bactericidal properties in 1909. Prontosil and prontosil soluble which DOMAGK showed were curative in streptococcal infections of mice were also azo compounds, and, as indicated by TRÉFOUËL and associates, owed their activity to the production of sulphanilamide in the body. In Britain rapid development took place with the production of the wide range of sulphonamides known to us today. Marfanil *p*-aminomethyl-benzenesulphonamide, made in Germany, was a new type very useful for the local treatment of wounds.

The development of thiosemicarbazones followed the observation that the benaldehyde derivative was active *in vitro* against the tubercle bacillus, and other derivatives with wide variations in substituent groups were tested. Free thiosemicarbazide proved toxic for use in animals and was also inactive. The sulphur atom appeared to be essential for activity since the corresponding carbazone in which oxygen replaced the sulphur was of no value in treatment. Some preparations were of value when given by instillation where tuberculous cavitation of the lung was present. Others were superior to chaulmoogra and sulphones in the treatment of leprosy. No development of importance followed the successful use of *p*-aminosalicylic acid.

In the newest group of substances, the antibiotics, the problem of production is no longer limited to the chemist but involves the biologist, bacteriologist and engineer. All the well known substances and their characters are described. Little progress has been made in Germany in this field so far compared with that in other countries. *J. D. Fulton*

SCHOENAERS, F. & GREGOIRE, C. Liste de parasites des animaux domestiques au Congo Belge. [**Parasites of Domestic Animals in the Belgian Congo.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Dec. 31, v. 30, No. 6, 1545–8.

BOOK REVIEWS.

HOLLAND. [Ministry of Social Affairs.] **Malnutrition and Starvation in Western Netherlands. September 1944–July 1945. Part I.** [Editorial Committee : G. C. E. BURGER ; J. C. DRUMMOND ; H. R. SANDSTEAD.] pp. vii+187, 70 figs. 1948. The Hague. General State Printing Office.

——. **Appendices to Malnutrition and Starvation in Western Netherlands. September 1944–July 1945. Part II.** 299 pp., numerous charts & 1 folding pl. 1948. The Hague : General State Printing Office.

To-day in the Tropics, famine presents a greater potential threat to public health than any of the old pestilences. No health authority in the tropics can afford to neglect this admirable report. In no other famine have those in charge been able to present such a clear picture, both of the clinical features of a starving population and of the administrative problems of relief. The presence of tropical diseases and a different nutritional and social background of a people will not invalidate many of the important lessons that can be learned from experiences in Holland.

Before 1939 the Dutch were a well-fed and healthy people. After the occupation by the Germans in 1940 their whole food economy was disrupted ; but owing to a good system of rationing and the self-discipline of the people, although many were hungry, none starved, and the general health of the people only deteriorated slightly until the autumn of 1944. With the presence of the liberating army on a small part of Dutch soil, relations with the Germans became worse. Supplies of food and transport were greatly curtailed. The official ration for adults fell abruptly, and in the spring only yielded some 600 calories per day. In the towns at least, unofficial sources and black markets provided little or no supplement for most persons. In April and May, 1945, the chaos that preceded the final German collapse led to a total failure of the ration supply in some districts. Fortunately the relief measures planned proved promptly effective and the tragedy was rapidly curtained. Perhaps the best measure of its extent is given by the death-rates in the cities of Amsterdam, Rotterdam, The Hague and Utrecht. For 1939 this lay between 8·5 and 9·7 deaths per 1,000 inhabitants. By 1944 it was between 10·7 to 13·0, still a good figure by most standards. For the first six months of 1945, the annual rate in these cities rose to between 24 and 29 and in each went as high as 40 for the worst week. Much of the excess mortality was directly attributed to starvation. In this, as in other famines, changes in the death-rates provided a valuable measure of the extent and progress of the disaster.

This report describes the detailed relations between the Allied Military Authorities and the Dutch Civilian Authorities, who had the combined responsibility of planning the relief. The intelligent understanding of each other's problems and point of view greatly facilitated the famine administration. Railway waggons and lorries are at the heart of most famine problems, as also of every military operation. Their provision and proper use is a sure test of the efficiency of the administrators. On the executive side much of the relief was distributed through 51 Medical Feeding Teams assisted by three Nutrition Survey Teams. The composition of these teams, their equipment and the work done are described in detail, and these details are the core of the report and worthy of minute study. Each team consisted of one physician, one head nurse, five assistant nurses, five social workers, two drivers and one administrator. Their first duty on reaching their allotted district was a rapid assessment of the health of the people. This was not always easy. The cheering crowds greeting the liberating armies in the main streets were often deceptive and hid the starving and dying, who lay at home

in the back streets and had to be sought out. Assessment was usually based on a clinical examination of about 100 unselected persons on detailed dietary histories and from conversations with local doctors. The three survey teams had facilities for biochemical studies of blood and urine. Their findings are fully given in the appendices. It would appear that biochemical methods were of little use in the immediate assessment of a famine situation, but the results obtained by these teams have, of course, clarified our understanding of important problems arising, notably the mechanism of famine oedema. Clinical judgment was the basis of the nutritional assessment. As in so many recent famines (notably in Bengal) evidence of vitamin deficiency diseases was not frequently found. The real problem was to find where the people, who had lost most weight, were and take the relief there.

An unexpected difficulty was that in some instances the gravity of the situation was curiously underestimated by local authorities: it was not realized quickly enough what the relief measures could do. "Leave us alone, we'll manage ourselves" was a psycho-pathological reaction to semi-starvation, and at some places it took time to achieve a *rapprochement* with the "blazing enthusiasm of the liberation neurosis" among the relief workers. The psychological problems of the famine were clearly many and diverse.

Large quantities of predigested foods of the type of protein hydrolysates had been prepared for resuscitation purposes in the last stages of starvation. These were found to be of very limited use. Numerous investigations recorded that the gastro-intestinal tract of seriously starved persons can digest foods such as separated milk and even large quantities of butter with unexpected facility. Many details of food supply and dietary schedules are given in the report.

It is quite impossible to attempt to abstract a report packed with detail nearly all of which needs careful study. It is on attention to innumerable points of detail that the success of famine relief measure depend. We urge public health authorities in the tropics to get this report, read it and then re-read it. Only blind optimists will neglect its lessons. The report is edited by Dr. G. C. E. Burger, Sir Jack Drummond and Dr. H. R. Sandstead, who at the time of the famine represented respectively the Netherlands Department of Health, the British Ministry of Food and the United States Army. It is proper to end by thanking them and the Netherlands Government for making so much valuable information freely available. *R. Passmore*

Keys, Ancel, Brožek, Josef, Henschel, Austin, Mickelsen, Olaf & Taylor, Henry Longstreet, with the assistance of Ernst Simonson, Angie Sturgeon Skinner & Samuel M. Wells. **The Biology of Human Starvation.** With Forewords by J. C. Drummond, R. M. Wilder, C. G. King & R. R. Williams. Vol. I. pp. xxxii+1–764. Vol. II. pp. viii+765–1385, 158 figs. & frontispiece. 1950. Minneapolis: University of Minnesota Press. London: Geoffrey Cumberlege, Oxford University Press. [£6 10*s*. 0*d*.]

During a famine, conditions are unfavourable both for controlled observation and scientific measurement. Consequently the accounts of the reactions of the human body to chronic semi-starvation recorded by medical men in the field have inevitably lacked precision and left fundamental problems unsolved. Hitherto laboratory studies for the most part have been limited to experiments on acute starvation on professional starving men. The reports of widespread starvation in the war years led Professor Ancel Keys and his colleagues at the University of Minnesota to undertake a study during 1943–44 of semi-starvation in volunteers under laboratory conditions. Thirty-two conscientious objectors

offered themselves as subjects and lived in the laboratory of Physiological Hygiene for over a year.

During a control period of three months they were given a diet containing approximately 3,500 calories per day. Then for 6 months the diet was reduced to 1,570 calories in the form of potatoes, cabbage, turnips and cereals and only very small portions of animal protein each week. The experimental diet resembled approximately that consumed under famine conditions in Europe. During this period they lost on an average 24 per cent. of their body weight, and were reduced to a condition closely resembling famine victims. All at some time had famine oedema. The subjects were then studied for a further 3 months in the laboratory under various regimes of rehabilitation, and most of them were observed for a further 6–9 months at intervals. A year after the end of the starvation period, all had returned to normal and were none the worse for their ordeal. During the year in the laboratory the basic physiological and psychological state of the subjects was reviewed at regular intervals by teams of investigators. Important observations were made on the weight changes, the distribution of body fluids, the basal metabolism, the energy exchanges during exercise, the capacity work, the size of the heart, adaptations in the circulatory system, and changes in the cellular elements in the blood. The psychological observations included studies of behaviour patterns, personality changes and intellectual abilities.

The many important findings cannot be summarized in a review article. Suffice it to say that the Minnesota experiment was planned and executed by a co-ordinated team of first-class investigators. There is no record of any experiment in either human physiology or psychology on a comparable scale. The experiment will become a classic. The details are clearly of great importance to those concerned with the practical problems of medicine in a famine. The general plan of the experiment will be of interest and indeed an obligatory study for future investigators into the many problems presented by adaptation of physiological and psychological processions in man to prolonged adverse environmental conditions.

Unfortunately the choice of presentation of this great experiment is unsatisfactory. "Human Starvation" weighs 3·45 kgm. and suffers, like so many American books to-day, from over-nutrition. Striving for completeness the authors have stuffed the book with facts collected by others less competent or less well-placed than themselves. In consequence the fascinating account of the Minnesota experiment is often buried. Chapter 3, containing 29 pages, is entirely devoted to old work, long dead, which might have been allowed to rest. Many other examples of inferior work quoted could be given.

There must be many physiologists, psychologists and physicians who would like a straightforward account of this great experiment for their personal use. Is it too much to ask Professor Keys to provide such an account, which would fall within the limits of a private purse and slip easily down the side of the suitcase of the physician setting out on famine relief work? *R. Passmore*

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